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THE FISHERY RESOURCES OF THE PHILIPPINE ISLANDS. PART III, PEARLS AND PEARL FISHERIES.¹

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(From the Section of Fisheries, Biological Laboratory, Bureau of Science, Manila,
P. I.)

INTRODUCTION.

During the past ten years the writer has been engaged, as time would permit, in making a study of pearls and pearl fisheries. In 1900, a year was spent in the fisheries of Paumotu and Gambier Islands and in 1902 the fisheries of Australia and the Solomon Islands were visited; during the past year considerable time was given to a study of the pearling grounds of the Philippine Islands.

So far as possible, a careful study has been made of the development, life history and habits of the pearl oyster, chiefly with the view of increasing its value as a commercial asset. Experiments relating to pearl growth, development and culture have been inaugurated; and a large number of both hard and soft sections through pearls from various localities have been made in order to throw additional light on the direct cause of their origin and growth.

The object of the present paper is to give the results of these observations and a general review of our present knowledge of the subject, with the hope that such results may lead to increased interest in the Philippine pearl fisheries and to their greater development.

¹Part I of this series appeared in *This Journal* Sec. A (1908), 3, 513; Part II, *Ibid.* (1909), 4, 57.

PHILIPPINE PEARL OYSTERS.

There are two varieties of pearl oysters in the Philippines which are of considerable commercial importance: One, called the gold lip pearl shell, Doctor Pillsbury kindly informs me is doubtless *Margaritifera maxima* Jamson² (see Plate III, figs. 1 and 2); the other, the black lip pearl shell, is *Margaritifera margaritifera* (Linnaeus). (See Plate IV, figs. 1 and 2.) The gold lip shell is by far the most important, it being the variety chiefly sought in commercial ventures, its market value being from 30 to 80 pesos³ per picul of 63.3 kilos (139.5 pounds). This shell, when mature, is usually from 180 to 230 millimeters (7 to 9 inches) in diameter and weighs from 1.82 to 2.3 kilograms (4 to 5 pounds); shells weighing more than 5 kilograms (11 pounds) have been found. This species occurs in waters of from 5 to 20 fathoms throughout the Sulu Archipelago, and is probably more or less abundant throughout the entire Philippine group.

The black lip shell is a much smaller variety, rarely exceeding 150 or 180 millimeters (6 or 7 inches), with a weight of from 1 to 1.5 kilograms (2 to 3 pounds), although usually it is much smaller. It is common along the shores of almost all the islands of the Philippine Archipelago, and is of much less value commercially than the gold lip shell, being in but little demand and selling for about 13 pesos per picul. This form usually gives a large yield of pearls which are of comparatively little value, as they generally are small, irregular in shape and of a gray or dusky color.

In the year 1886 a paper was published in Bergen, Norway, which contained the following interesting statement regarding the Philippine pearl fisheries:

The Philippine Islands produce great quantities of pearl shell. In 1877, 155 tons were exported. In 1878, 152 tons, valued at 164,720 pesos were exported. In 1879 the value of exported pearl shell was 155,802 pesos. The entire region from Tawi-Tawi to Basilan is a continuous pearl oyster bed; the Sulu fisheries are the largest and most productive of any in the East Asiatic waters. The pearls are famous, and the shell has a fine luster. Labuan is the chief market. The yield is decreasing.

It will be of interest to compare the above account of the fisheries of thirty years ago with those of the present time. During the year 1907 there were exported from the port of Jolo 154,918 kilos (340,820 pounds) of pearl shell, valued at 119,045 pesos; and during the same period the product exported from Zamboanga was valued at 45,254 pesos, making a total of 164,399 pesos from the Moro Province alone, which shows a substantial increase rather than a decline in the fisheries. The above value

² Revised Nomenclature of Pearl Oysters. *Proc. Zool. Soc. London*, (1901), 1, 392.

³ One peso equals fifty cents U. S. currency.

is of the shell alone; that of the pearls secured during this time is unknown, but doubtless it amounted to several thousand pesos.

No export duty is charged on shell, but wharfage to the amount of 1.50 pesos per ton is collected.

The price of shell at the present time is from 60 to 100 pesos per picul for those of the first class of the gold lip variety, and about 20 pesos per picul for the black lip variety. The picul is counted at 63.3 kilograms (139.5 pounds, 16 piculs to the ton). Almost all the shell is sent either to Singapore or to Europe. There is one button factory located in Manila which has a capacity, when running constantly, of about 6,000 gross per month, requiring about 300 tons of shell per year; otherwise, all the shell is exported.

During the past year about 56 tons of shell were taken from the Davao pearl bed. These were of very large size and first class in every respect. They gave a very small yield of pearls, the value of which was probably not more than 6,000 pesos. Some very beautiful pearls are to be found in the Sulu fisheries, and it was my pleasure to examine two of these, each valued at 5,000 pesos, secured from this region during the past year.

Almost all the fishing for pearl oysters is carried on by the use of diving armor, in water of from 15 to 20 fathoms. Shells are occasionally found in shallower water, but in such cases naked Moros usually dive for them, or they are secured by a primitive rake-dredge worked by a rattan line from a native canoe and which can be used only in smooth water. The natives frequently soak dry shell in water for several days before it is sold, in order to increase the weight; and I have seen Chinese and other middlemen doing the same thing. The shells are usually opened on the boats and all the pearls extracted soon after the oysters are brought up.

THE PEARLING FLEET.*

At present about 30 vessels are engaged in pearling in the Sulu Archipelago. These boats range from 5 to 15 tons, and usually carry a crew of seven men, including the diver. All boats with armored divers

*The following boats constituted the Zamboanga pearling fleet for the year 1908: *Sirena* and *Nautilus*, owned by J. F. Maddy; *Cleopatra*, *Galatea*, and *Maritima*, owned by J. Wilson; *Ioenix* and *Placido Reyes*, owned by the Cebu Pearling Company; *Mina*, *Burtandy*, *Ida*, and *Manny*, owned by Capt. Chas. Linberg; *Paragua*, *Zamboanga*, and *Sapit*, owned by G. W. Langford; *Alice Holmes*, *Rosario*, and *Olinga*, owned by Mr. Holmes; *Mindanao*, owned by Mr. Teck; *Pruno*, owned by V. Sision. All of these boats carried on more or less active operations during the past year.

The Jolo pearling fleet is composed of the following boats: *Victoria*, *Helena*, *Santa Maria*, and *Elisabet*, owned by Ong Tiam Teng; *Almosouth*, owned by Hadji Abubacal; *King of Spades*, owned by Richard H. Gibbs; *Ramon*, owned by Hernandes & Co.; and *Alfonso* and *Nena*, owned by Asing.

are required to take out a license, for which the charges are 300 pesos a year for a first-class license, or a three months' license may be secured for one-fourth of this amount. These are obtained from the provincial treasurer at Jolo, Zamboanga, or Davao. The divers are usually natives or Japanese. Each boat is equipped with one complete diving outfit, consisting of armor, pump, tubes, weights, etc. The diver receives a wage of from 20 to 80 pesos per month, in addition to a percentage of the shell, but the terms upon which both men and divers are hired vary with almost every pearler.

The treasurer of Davao reports that nine first-class licenses have been taken out at that place since January, 1908, chiefly by local firms, and for the purpose of working the newly opened Davao pearl bed.

It costs about 55 pesos a month, aside from wages, to navigate a pearling boat. The diving armor used is nearly all of a modern type, and of English manufacture. The air pumps used are worked by hand, two men being stationed constantly at the pump when diving is in progress. The diver has from 18 to 20.4 kilos (40 to 50 pounds) of weight attached to him in order to reach the bottom. Divers usually remain under water until they fill the net basket which they carry, this requiring from ten minutes to an hour. The diver of a boat on which I was a guest for some time, usually made about three descents in one hour; this was on the Davao bank in a depth of 20 fathoms and where the man experienced great difficulty in working because of strong currents. The length of time during which an armored diver can remain under water is very indefinite, depending on the depth of water, strength of current, strength of the diver, and other factors. In calm water, but a few feet in depth and of an even temperature, a man should be able to remain for almost an indefinite period. The naked diver scarcely ever stays down for more than one minute. Fishing is carried on at all seasons of the year.

THE PHILIPPINE PEARLING BANKS.

Practically the entire region from Sibutu Passage to Basilan Straits and around the southern shore of Mindanao Island is a continuous potential pearling bank. However, the greater number of the known localities have so constantly been fished that they have had small chance to recover, and, as a result, much of the pearlers' time is lost in prospecting for new beds in various parts of this wide area; but the ground never seems to become completely exhausted, for we found pearling boats operating successfully directly in front of the town of Jolo, within half a mile of the beach. Fishing for shell had doubtless been carried on at this point for over a hundred years.

Occasionally, a pearler will locate a bank on which the oysters are

very abundant. Such a bank was found just south of Basilan Island; another near the Tapu Islands, and another in Tataan Pass of Tawi-Tawi Island. A large yield of shell has been secured near the Samales group. Shell has been reported from Illana Bay, and during the past year an extremely valuable bank was located in the Gulf of Davao in Pakiputan Strait between Samal Island and the mainland. The most prolific portion of the bank was in the narrow part of the passage directly between Point Lanang and Point Linao. The depth of water is from 20 to 25 fathoms. The bank is well protected above by the large reef known as Arboles Island. Usually, there is a very strong current pouring through this strait, but at the point where the pearl bank occurs the tides and currents form a strong eddy which has doubtless contributed to the formation of the bank by giving an opportunity for the spat to settle and attach. The bottom is of coral, sand, and gravel, and is comparatively smooth. The width of the strait at this place is less than 1.6 kilometer (1 mile); the beach on one side slopes steeply down, and on the other drops abruptly into several fathoms of water from a live coral reef. The water is quite clear, its temperature about 24° C., and its specific gravity 1.022. At the time of my visit (May, 1908), there were only four pearling boats operating on this bank; two others were prospecting in adjacent waters.

The currents were so swift that diving could be carried on only between the hours of 6 and 7 o'clock in the morning. The diver, a Filipino, during this hour made three trips to the bottom; on the first he secured three shells; on the second, eight; and on the third, two. These were all large, first-class shells, each weighing about 3.2 kilos (7 pounds). One contained a small pearl.

The diver brought up some young shells for our inspection, and reported that they were abundant on the bed. All the large oysters were in a breeding condition, so probably this bank will be able to keep up a moderate yield, unless overfished at the beginning. So far, the Davao pearl bank has yielded about 56 tons of first-class shell.

Pearl shells in considerable numbers are found in Tañon Strait, between Cebu and Negros Islands; in the vicinity of Guimaras; and also along the west and the north coast of Samar. Shell has also been reported from Palawan and Cagayan Sulu. It is more probable that as the Islands become better known, many new pearling banks will be found, and those now known will be mapped and better defined.

The most desirable bottom for a pearl bank is coarse sand, with dead coral and rock to which the young may attach. They can not grow on live coral, and they are very apt to be covered up and smothered on fine sand.

LIFE HISTORY OF THE PEARL OYSTER.

The oysters are of separate sex, male and female. The eggs of the female, when ripe, are extruded into the sea water, where they are fertilized by the spermatozoa of the male, if by chance the currents bring the two elements together. Doctor Hornell⁵ observed in regard to the Ceylon pearl oyster, "that a ripe female, in close proximity to a mature male, was sufficient cause to excite the male to throw off spermatozoa." The meeting of the spermatozoa and ova is left entirely to chance.

The eggs of the Philippine pearl oyster (*M. maxima* Jamson) are at first pyriform (see fig. 1) and float on the water; as soon as they are

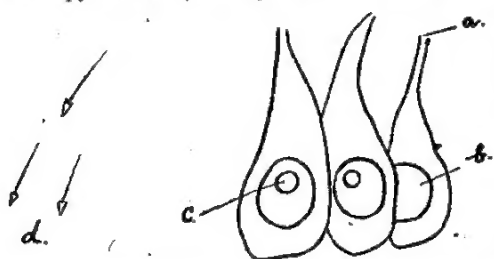


FIG. 1.—Spermatozoa and ova of Philippine pearl oyster.

- (a) Micropyle through which the spermatozoa enters the ova.
- (b) Nucleus.
- (c) Nucleolus.
- (d) Spermatozoa of male.

fertilized, they become round; and when from three to six hours old, they move about by means of small, hair-like cilia. Segmentation is complete, but unequal. The shell begins to form at the end of the second day, and in from four to eight days the young oysters settle and become attached to the bottom, or to any object they chance to fall upon. At this stage they are known as spat and

are about 1 millimeter (0.04 inch) in length. They attach by means of a small tuft of coarse, hair-like bristles, known as the byssus.

Each mature female contains several thousand eggs, but no doubt the destruction of eggs and young is very great, many being swept into great depths by strong currents, where they either perish or settle on the bottom so thickly as to smother each other; or else they become covered with sand, or attach to some floating object and are washed ashore. Apparently, there is no fixed time in the Philippines for the maturing of the ova, as sexually ripe individuals are found at all seasons of the year.

The shells are supposed to reach a maximum size and are most valuable commercially in from four to five years, although they doubtless continue to grow for several years longer. I have examined specimens weighing 5 kilos (11 pounds) which I believe were ten to twelve years old. However, shells older than five or six years are apt to be worm-eaten or full of holes caused by boring sponges, and so are of less value. More

⁵ Report on the operations of the Ceylon pearl banks during the fishery of 1905. *Rep. Ceylon Marine Biol. Lab.* (1906), 55.

accurate information regarding the age and growth of shells obtained from direct observations and measurements is very desirable.

Mr. Seville Kent states in regard to the rate of growth of the pearl oyster:

Under favorable conditions a period not exceeding three years suffices for the shell to attain to the marketable size of 200 to 230 millimeters (8 or 9 inches) in diameter, and heavy shells of 2.3 kilos (5 pounds) weight per pair may be the product of five years growth.

The food of the pearl oyster consists of minute marine infusoria, *Diatomaceæ*, etc. We discovered that in fully 75 per cent of the specimens examined, the food consisted of *Diatomaceæ* with a small amount of vegetable matter.

The pearl oyster does not travel to any great distance; in fact, after the spat stage, it remains in one spot for the greater part of its life, although it can, and does at times, cast off the byssus attachment and reattach to some more desirable place, moving very slowly by means of its small foot. The very old shells of *M. maxima* Jamson were, with but few exceptions, without attachment, probably the weight of the shell being sufficient to keep them in place.

ENEMIES OF THE PEARL OYSTER.

The pearl oyster, especially in its younger stages, is exposed, to constant danger. Numerous fishes consider it a great delicacy, and such fish are found in large numbers about the pearl banks. The various species of sharks, rays, sparoides, and balistes feed largely upon shell fish, including the pearl oyster. However, these are not wholly an evil, as they are probably the intermediate host for the cestode which is the cause of the growth of pearls; the fish becoming infested with this cestode by eating the oyster. Doubtless, star fishes also cause much destruction to the banks, and, in old specimens, the boring sponges, boring worms, and gastropods, do great damage.

In addition to these enemies which affect the oyster directly, there are an enormous number of marine animals and plants that, by using up the available space and food which otherwise would fall to the lot of the pearl oyster, affect the life of the oyster indirectly.

One pearl diver reported the finding of a very large pearl bank south of Basilan Island, where the shells were abundant and of very large size, but of no value, as they were dead and had lost their luster. In cases of this kind, it is almost impossible to state the cause of the destruction. It may have been brought about by some epidemic due to the crowded condition of the shells, or possibly by some volcanic disturbance, or a dozen other causes might be assigned, but without facts it is useless to theorize on the subject.

TRANSPLANTING AND CULTIVATING THE PEARL OYSTER.

Pearl oysters may with but little difficulty be transported for several days, if they are kept in running salt water, or if the water is changed frequently; thus the question of transplanting them from one bed to another in a more convenient locality, or in water of less depth, becomes a comparatively simple one and will doubtless play an important part in the pearl oyster industry of the future.

As a matter of fact, the Ceylon government is, or was at a recent date, engaged extensively in the transplanting of young oysters and the distributing of "clutch," i. e., rock of small size which is scattered over the bottom of the oyster beds, and to which the young oysters become attached. The young pearl oysters are removed from beds which are overcrowded to others which are less productive.

It would be an easy matter for men engaged in pearling to keep suspended over the side of their vessels bamboo crates or cars in which they could place the young oysters which are frequently brought up, and so transport them to a favorable place for development, as is the case in the sponge fisheries.⁶ In this way they might, with but little effort, accumulate a valuable pearl farm where a number of oysters could be harvested each year and the bed looked after just as in the case of the edible oyster. The yield of pearls and shell would doubtless pay a good dividend. This process would especially be easy to carry out in the Davao fisheries which are near shore and where local people are engaged in the fishing. Such farms should simulate the natural beds so far as practicable, but improvements over natural conditions could be effected by supplying an abundance of small, broken rock as "clutch," upon which the young could attach; the keeping of the beds free from undesirable tenants, such as star fish, holothurians, etc., could be accomplished by dredging.

LAWS RELATING TO PEARL FISHING.

I have abstracted the laws,⁷ or at least such portions of them not repealed by amendments, as are now in force in the Islands.⁸ They are of undoubted benefit in protecting the young shells, and, for the greater part, relate to the waters of the Moro Province. In other portions of the Archipelago, various local acts and provincial legislation greatly handicap the pearling industry.

⁶ *This Journal*, Sec. A (1909), 4, 62, 63.

⁷ These laws were enacted by the legislative council of the Moro Province. A copy of them may be secured from the provincial treasurer of either Jolo or Zamboanga.

⁸ Sec. 23, Act No. 51, of the Philippine Commission should read: "The words 'pearl shell and shell of the pearl oyster as used in Act No. 43 of the Legislative Council and in this Act shall be construed to mean the shell of the marine bivalve mollusk *Margaritifera maxima* Jamson, commonly known as the Philippine gold lip pearl oyster.'"

The laws should be extended to include the entire Archipelago, and all local regulations should be repealed. In this way only can the young shell properly be protected. Additional legislation protecting the black lip pearl shell, *Margaritifera margaritifera* (Linnaeus), should be enacted.

Act No. 43 provides for the protection of pearl fisheries within the jurisdiction of the Moro Province, and was passed February 29, 1904. It forbids the taking of pearl oysters less than 100 millimeters (4 inches) in diameter.

Act No. 51 regulates the fishing for shells of marine mollusks and was enacted June 7, 1907, at the urgent request of the pearl fishers. It prohibits from engaging in pearl fishing all vessels not built in the Philippine Islands or in the United States, or not wholly owned by citizens of the United States or by people having the political rights of the natives of the Philippine Islands. It prescribes the places at which licenses to engage in pearl fishing may be secured, the price for such licenses, and the length of time for which they are granted. It states that the master of every vessel operating under a first-class license shall record the date of every operation and the number of shells taken each day. Before any shell can be landed, these records must be verified under oath in the presence of the collector of customs of Jolo or Zamboanga. This Act also amends Act No. 43 and requires the size of the shell to be 180 millimeters (7 inches) in diameter from the outer margin to the middle of the hinge, measured at a right angle to the hinge. A fine of not less than 50 pesos is provided for the violation of any provisions of this Act.

Act No. 131 amends Act No. 51 by reducing the price of first-class shell licenses to 300 pesos per annum, and provides for the issuance of such licenses for periods of three months. The enforcement of Act No. 51 resulted in such a decrease of revenues, owing to the excessive cost of licenses, that this amendment was made necessary, and it was enacted August 22, 1905.

Act No. 176 amends section 2 of Act No. 51 and was enacted October 12, 1906. It provides for the issuance of licenses only to those vessels wholly owned by citizens of the United States, to honorably discharged soldiers or sailors of the United States Army and Navy, to natives of the Philippine Islands, or to those having the political rights of natives.

Act No. 200 repeals Act No. 176 and was enacted September 19, 1907, and approved by the Philippine Commission October 7, 1907.

PEARLS.

The Philippine fisheries give a fair yield of pearls; in fact, some of the most beautiful specimens ever discovered have come from the Sulu fishery. The yield is fully as large as that in either the Gambier Islands or the Pearl Islands. The number of pearls secured in Ceylon is much greater. In that country the commercial pearl oyster is of a different species (*Margaritifera vulgaris* Schum.), a very small oyster prolific in pearls, but with shells of practically no value.

The composition of a pure pearl as given by Harley and Harley^a is as follows:

Carbonate of lime	91.72
Organic matter	5.94
Water	2.23
Loss	0.11

^aThe Chemical Composition of Pearls. *Proc. Roy. Soc. London* (1888), 43, 461.

and that of the Ceylon mother-of-pearl, as given by Herdman and Hornell²⁰ is—

Calcium carbonate	88.79
Calcium sulphate	4.93
Organic matter	2.32
Water	2.28
Loss (no magnesium, no phosphates, faint trace of iron)	1.68

It is well known that the organic basis of the shell, conchiolin, is a cuticular product excreted by the underlying epidermis of the mantle.

Passing without comment the many fanciful theories regarding the formation of pearls which have been held from historic times up to a comparatively recent date, we will consider only such facts as have been revealed by modern scientific investigation.

I have in my work dissected a large number of pearls from our large gold lip pearl oyster (*M. maxima* Jamson). Of this number, forty were prepared as "hard sections," each side being ground down so that a small transparent section through the center of the nucleus was obtained for microscopic examination. (See Plate V, figs. 1 to 3.) Ten were prepared as microtomic sections, and the remainder, and by far the greatest number, were dissolved in acids of various kinds and dissected.

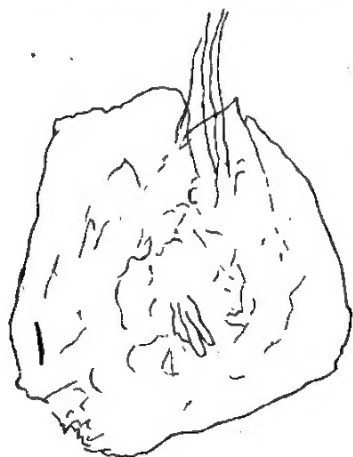


FIG. 2.—Cestode from center of a Philippine pearl.

The results show that the round orient Philippine pearl may have various objects in the center forming the so-called nuclei, which, because of stimulation or irritation, have become incased in nacre, thus forming pearls. Fully 50 per cent of the pearls examined contained larval cestodes, two only contained sand, one a bit of seaweed, one a spicule of calcareous sponge, two, forms which with but little doubt were larval Distomids. One rather interesting form (see fig. 2) obtained from a perfectly round pearl appears very closely to resemble the free-swimming larval cestodes secured by Mr. Hornell in Ceylon,²¹ and is doubtless a related form. Several pearls contained

material that had become calcified and could not be identified with any degree of certainty. Three had what I believe to be the ova of the small

²⁰ Report of the government of Ceylon on the pearl fisheries of the Gulf of Manaar. Roy. Soc. London (1906), Part V, 6.

²¹ Hornell & Shipley. Reports on Parasites of the Pearl Oyster. Rep. Ceylon Pearl Fishery (1903-1906), Part II, 77; Part III, 49; Part V, 43.

crab (*Alpheus avarus* Fabricius) which is almost without exception found living in pearl oysters as a commensal.

Pearls may be found in any part of the oyster, or in the shell. The free pearls and those attached to the shell result from some injury, while those in the muscles are formed around small, calcareous bodies called calcospherules. The so-called "blisters" on the inside of the pearl shell are usually produced by boring worms or by some external injury. How-

ever, in one case at least, a very fine blister now in my possession was caused by a small black pebble which was completely embedded in the shell. Blisters frequently contain pearls of value, and specimens of good shape and luster may become fully embedded in the shell. I now have a shell before me which, when found, exhibited no sign of a pearl, but when broken, showed two fine pearls, embedded and completely hidden in the shell. (For similar examples see figs. 3 and 4.)



FIG. 3.



FIG. 4.

A bit of shell in which a pearl valued at 500 pesos was hidden. The X, fig. 3, shows where the pearl was located. Fig. 4 is the same shell cracked open, showing the pearl.

Cyst pearls are found in the mantle or soft parts of the oyster. These are formed by a larva, usually a cestode, which enters some portion of the connective tissue where, as stated by Doctor Jamson,¹² it at first occupies a space lined with connective tissue fiber; but the oyster soon gives rise to a pearl-secreting, epithelial layer which lines this space and becomes the pearl sac. I am of the opinion held by Mr. Herdman and Mr. Hornell¹³ that this pearl-secreting epithelium is of ectodermal origin.

ARTIFICIAL PRODUCTION OF PEARLS.

From the time of Linnæus, who claimed to have discovered a method whereby the oyster could be made to produce pearls, up to the present date, the attempt to force the passive oyster into producing culture pearls has never ceased, so that almost each year some one announces in the press of the country that he has at last reached the true solution of the problem and can produce pearls at will. There is no question but that,

¹² The Formation of Pearls in European Mussels by Action of Trematodes. *Proc. Zool. Soc. London* (1902), 140.

¹³ Notes on Pearl Formation in the Ceylon Pearl Oyster. *Rep. Brit. Assoc.* (1903), 695.

in some cases at least, cultural pearls have been produced; but when the methods have been brought to the crucial test there is always some small point or flaw which has prevented their application with profitable results. This is at least true concerning the forming of the free, round, cyst pearls of fine luster, but in so far as the production of half-pearls and blisters is concerned, the Mikimoto pearl farm in the Bay of Ago, Japan, need only be visited to carry conviction that the artificial production of pearls is both practicable and profitable, for at this place several hundred people are employed in the work, and the cultural pearls harvested find a ready market at a good price. In fact some of the "antique" jewelry sold in Manila was found to be set with these. (See photograph of some of these culture pearls, natural size, Plate VI, fig. 1.)

From 200,000 to 300,000 oysters are treated each year at this pearl farm. The method employed is similar in most respects to that used by the Chinese hundreds of years ago, when small, rough images of Buddha were placed between the mantle and shell of the live river clam, which was then returned to the water until the images were coated over with nacre, after which they were taken out and sold as charms. The Japanese use a small canula to insert a minute mother-of-pearl bead which is flat on the side and which fits against the shell. The oyster is then again placed in the water and allowed to grow for six or seven years, when the pearls are harvested. The undertaking is profitable, owing to the large number of oysters treated.

However, the chief object to be desired is to grow round, perfect, cultural pearls of fine luster; in other words, to produce a cyst pearl, or one so closely resembling it as to be indistinguishable from it. Our efforts have been directed to this end, but the results so far obtained do not warrant publication. As an illustration of some of the difficulties encountered by those engaged in experimenting in pearl growing, a gentleman from Australia, who some time ago purchased the experimental pearl farm inaugurated at Tuesday Island by Seville Kent, and who had spent several thousand pounds in attempting to grow cultural pearls, remarked to me, "I have succeeded in growing the perfectly round pearls, but my great difficulty is to prevent their discoloration."

It may be predicted that within the next few years perfectly round cultural pearls of fine luster will be produced commercially and that the undertaking will prove to be the most profitable achievement of modern zoölogy.

Pearls of value sometimes are found in other mollusks of the Philippines, as, for instance, in the Taclobo (*Tridacna gigas* Linn.) which occasionally contains pearls of great beauty. (See Plate VI, fig. 2.) However, these usually are without luster and hence valueless.

DETERMINATION AND VALUATION OF PEARLS.

Pearls have a hardness of 4, they are so compact that they do not break when stepped upon; their specific gravity is 2.65 to 2.68. To be of much value they must be round or drop-shaped and either pure white, or dark, or of a golden color, with a peculiar luster and slight translucency. They must be free from spot, speck, or blemish. As they are formed, layer upon layer, around a central point, like the layers of an onion, they are sometimes peeled or "doctored" to remove spots or flaws, in the hope that the new layer will be of better luster. Such pearls are obviously of much less value than those found perfect, in their natural condition. However, any such tampering with a pearl can usually be detected by the use of a good glass, which shows any minute band-like stripes or slight scratches. It is also a very easy matter to detect whether a trifle more than one layer of a pearl has been taken off, and equally as easy to tell the difference between a pearl that has been ground into a round shape and one naturally round; such specimens are of but little greater value than marbles. The following is a table of the actual size of pearls of from 0.1296 to 1.944 grams (2 to 30 grains).





















Grains.		Grains.		Carats.
2		3		$\frac{1}{4}$
4		5		$\frac{3}{8}$
6		7		$\frac{1}{2}$
8		9		$\frac{5}{8}$
10		11		$\frac{3}{4}$
13		14		2
15		16		$2\frac{1}{4}$
17		18		$2\frac{1}{2}$
20		22		3
25		30		4

FIG. 5.—Exact sizes of pearls from 2 to 30 grains in weight.

No one but an experienced buyer can properly estimate the value of a pearl, as many conditions, such as size, shape, luster, flaws, etc., must be taken into consideration. In 1896 a very interesting publication was issued by the United States Government,¹⁴ giving the value of pearls all over the world, together with an estimate of the yield. In Manila, a perfect pearl of 0.0643 gram (1 grain) with good luster and shape retails for about 5 pesos. The price increases more rapidly than the size of the pearl, as from 70 to 100 pesos per 0.205 gram (1 carat) is asked for perfect pearls over 0.41 gram (2 carats) in weight.

¹⁴ Pearl Fisheries and Pearl Supply. *U. S. Consular Report*. (1896), 51, 622.

ILLUSTRATIONS.

PLATE I.

Landing pearl shell at Jolo.

PLATE II.

- FIG. 1. Jolo pearling fleet.
2. Pearl diver in the water.
3. Pearl diver coming out of the water.

PLATE III.

Philippine gold lip pearl shell (*Margaritifera maxima* Jamson).

- FIG. 1. Inside view.
2. Outside view.

PLATE IV.

Philippine black lip pearl shell (*Margaritifera margaritifera* Linnaeus).

- FIG. 1. Inside view.
2. Outside view.

PLATE V.

- FIG. 1. Section through center of Philippine pearl, showing an encysted cestode.
2. Section through a Philippine pearl, showing a calcified cestode in the center.
3. Section through a Philippine pearl which had a grain of sand in the center. It is also shown how a perfectly round pearl may become irregular and how it may be peeled to form a perfectly round pearl.

PLATE VI.

- FIG. 1. Culture pearls from the pearl farm in the Bay of Ago, Japan.
2. Pearls, found at Siasi Island in Tacloban shells.

TEXT FIGURES.

- FIG. 1. Spermatozoa and ova of Philippine pearl oyster.
(a) Micropyle, through which the spermatozoa enters the ova.
(b) Nucleus.
(c) Nucleolus.
(d) Spermatozoa of male.
2. Cestode from center of a Philippine pearl.
3. A bit of shell in which a pearl valued at 500 pesos was hidden. The *x* indicates the spot where the pearl was hidden.
4. The same shell as in fig. 3, but cracked open showing the pearl.
5. Exact sizes of pearls from 0.1296 to 1.944 grams (2 to 30 grains) in weight.



LANDING PEARL SHELL AT JOLO

PLATE I.

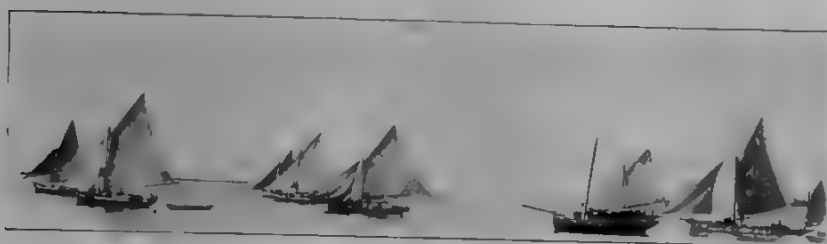


FIG. 1.

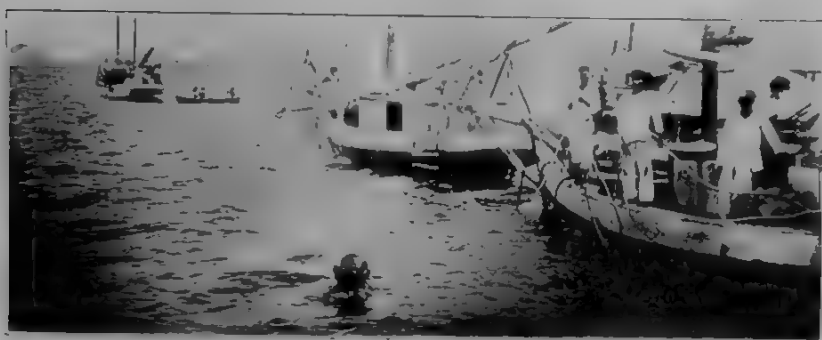


FIG. 2.



FIG. 3.

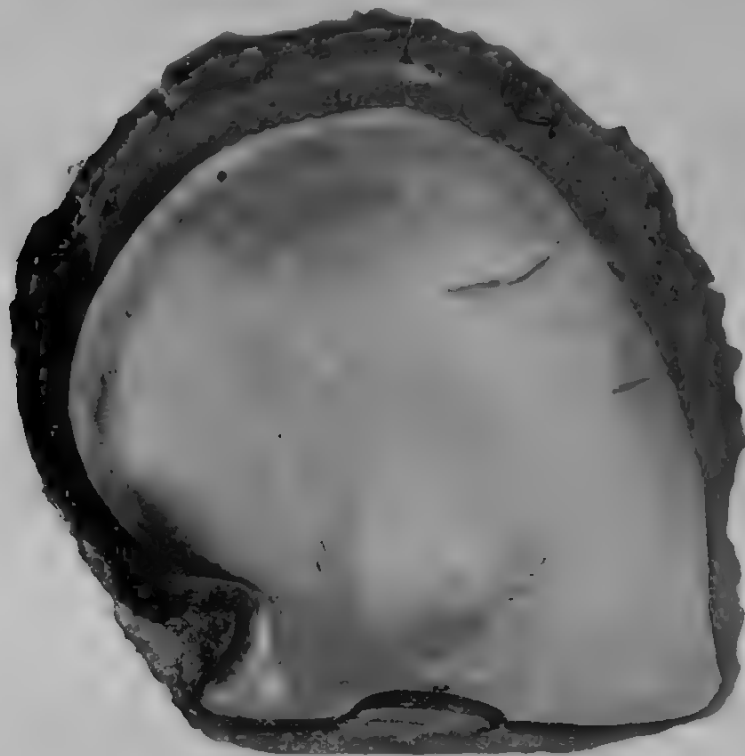


FIG. 1

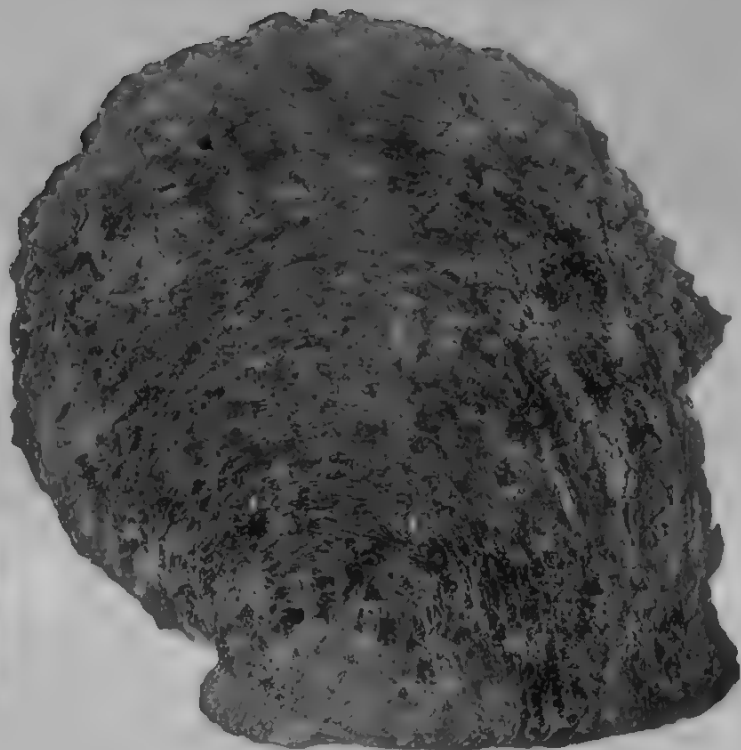


FIG. 2.

PHILIPPINE GOLD LIP PEARL SHELL (*MARGARITIFERA MAXIMA* JAMSON).

PLATE III.

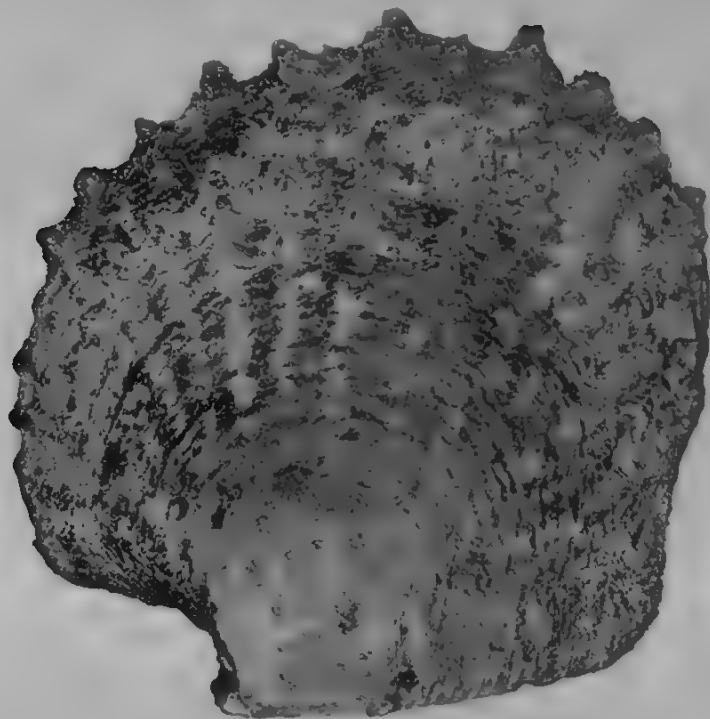


FIG. 1.
PHILIPPINE BLACK LIP PEARL SHELL (*MARGARITIFERA MARGARITIFERA* LINNAEUS)

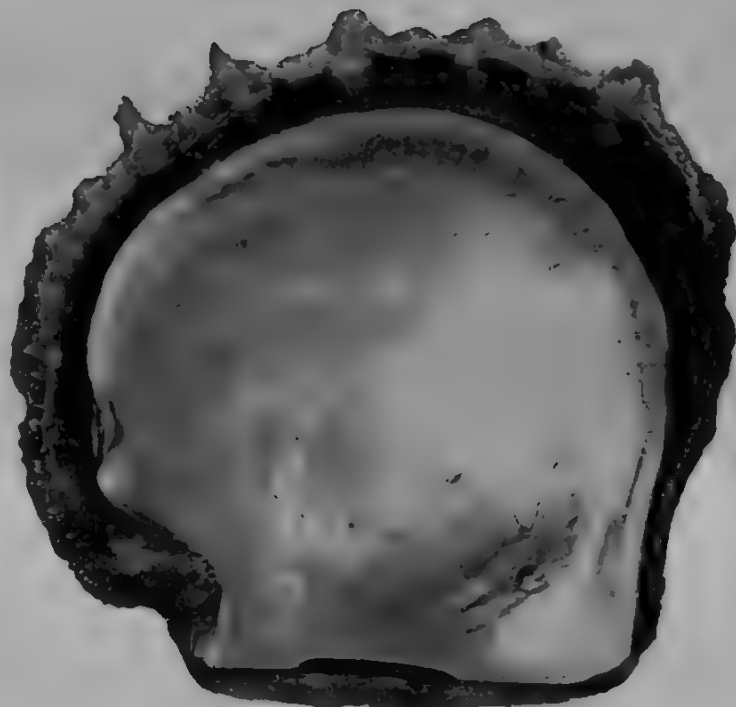


FIG. 2.

PLATE IV.

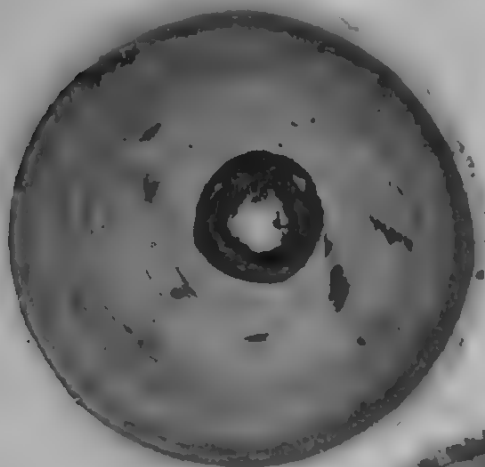


FIG. 1

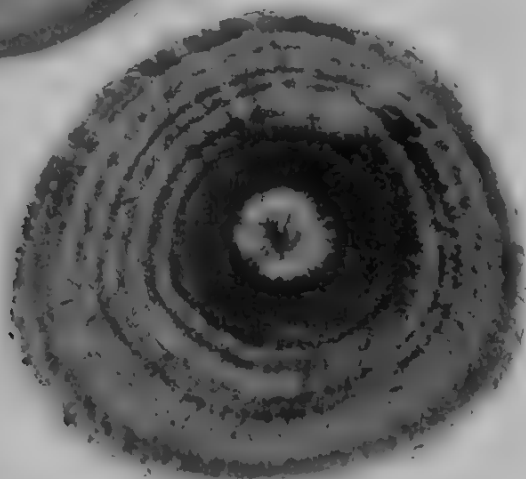


FIG. 2.

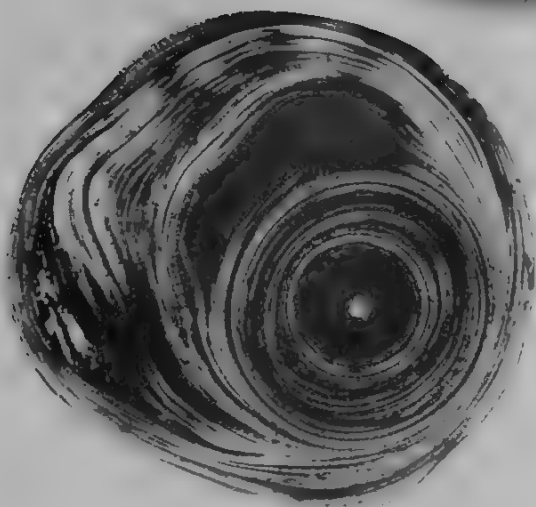


FIG. 3.

PLATE V.

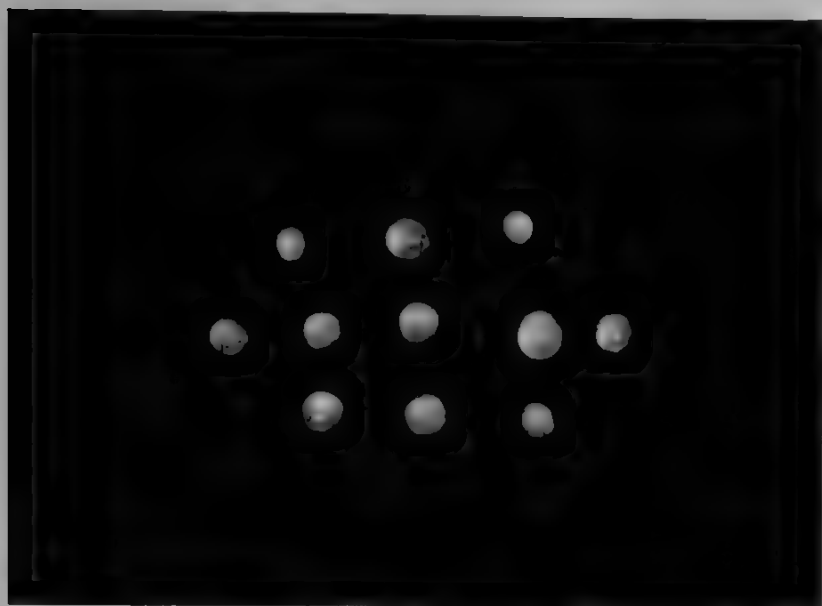


FIG. 1.



FIG. 2.

BIRDS COLLECTED IN THE ISLAND OF POLILLO, PHILIPPINE ISLANDS.

By RICHARD C. MCGREGOR.

(From the Ornithological Section, Biological Laboratory, Bureau of Science,
Manila, P. I.)

INTRODUCTION.

The Island of Polillo is situated some 36 kilometers from the nearest coast of Luzon in about the same latitude as Manila. Its area is roughly 900 square kilometers and its length, north and south, 56 kilometers. Although nearly the entire island is mountainous, no part of the surface has a great elevation, the highest point, Mount Malulud in the north-central part, being but 350 meters. With the exception of a few small areas planted in rice, mostly along the western coast, Polillo is heavily forested. No grass land was discovered and in no island have I seen so large a proportion of the area covered with trees.

In May, 1907, Mr. H. M. Ickis brought me a specimen of *Collocalia marginata* with nests and eggs which he had collected near the settlement of Burdeos on the eastern side of Polillo. Beyond this nothing has been known concerning the fauna of the island.

In September, 1909, with two Filipino assistants, I was landed at the town of Polillo and for two and one-half months we made collections of birds, insects, reptiles, mollusks, and plants.¹ The greater part of our collecting was done in the vicinity of the town and along the coast north and south of the town; a little time was spent near Burdeos. The birds collected, or certainly identified, number 101 species, of which I venture to describe the following as new: *Tanygnathus freeri*, *Penelopides subnigra* and *Kittacincla parvinnaculata*.

Rejecting migrants and other species of wide distribution, we find that Polillo has more in common with Luzon than has Marinduque, Catanduanes, Lubang, or the Babuyan. Of the seventeen species found

¹Dr. C. B. Robinson of the Bureau of Science visited Polillo during August, 1909, and he will publish in the botanical section of *This Journal* a paper on the plants collected by him and by my party.

in Luzon, but not known from Mindoro, Masbate, Samar, nor any of the other more southern islands, we find ten in Polillo, nine in Marinduque, five in Catanduanes, one in Lubang, and one in the Babuyanes. This is most clearly shown in tabular form.

List of species of birds confined to Luzon and smaller adjacent islands.

Species.	Luzon.	Polillo.	Marin- duque.	Catan- duanes.	Lubang.	Babuyanes.
<i>Leucotreron marchei</i>	×	×				
<i>Phleguinae luzonica</i>	×	/				
<i>Prioniturus lucionensis</i>	×		×			
<i>Loriculus philippensis</i>	×	×	×	✓		
<i>Corys melanura</i>	×	>				
<i>Hydrocorax hydrocorax</i>	×		✓			
<i>Penelopides manilla</i>	×		✓			
<i>Centropus viridis</i>	×	>				
<i>Dasylophus superciliosus</i>	>	×	×	✓		
<i>Lepidogrammus cumingi</i>	>		×			
<i>Crysocolaptes hematribon</i>	×	×	×			
<i>Lichtensteinipicus funebris</i>	×	×	×	×		
<i>Artamides striatus</i>	×	×			×	
<i>Irena cyanogaster</i>	×	×				
<i>Kittacincla luzonensis</i>	×		×	✓		
<i>Cermyris henkei</i>	×					×
<i>Cinnyris flayrans</i>	×			✓		
Totals.....	17	10	9	5	1	1

In Polillo, as in nearly all of the smaller islands, several of the genera which are most conspicuous in the large islands are not represented. Not one species of any of the following genera was found in Polillo:

<i>Caprimulgus.</i>	<i>Pycnonotus.</i>	<i>Hyloterpe.</i>
<i>Hemiprocne.</i>	<i>Copsychus.</i>	<i>Pardaliparus.</i>
<i>Cacomantis.</i>	<i>Orthotomus.</i>	<i>Callisitta.</i>
<i>Xantholama.</i>	<i>Cisticola.</i>	<i>Zosterops.</i>
<i>Pitta.</i>	<i>Megalurus.</i>	<i>Anthreptes.</i>

LIST OF BIRDS.

MEGAPODIIDÆ.

Megapodius cumingi Dillwyn.

Apparently very rare; two fresh eggs were purchased, September 27.

PHASIANIDÆ.

Gallus gallus (Linnæus).

The only specimen of the jungle fowl seen in Polillo was a female which had been caught in a trap.

TRERONIDÆ.

Osmotreron axillaris (Bonaparte).

This little pigeon was very abundant in thickets bordering the forest; it was frequently noticed feeding on the fruits of *Pandanus copelandi* Merrill. Name in Polillo, "punai."

Phapitreron amethystina Bonaparte.

The amethystine brown pigeon is known in Polillo as "cu-lu-cu-lu." It was usually killed in fruiting trees of various species of *Ficus* & *Urostigma*, but when not found in these trees it was rarely seen. Specimens from Polillo, Luzon, and Bohol appear to be identical in size and coloration.

Leucotreron marchei (Oustalet).

On October 19 a female fruit pigeon, presumably *L. marchei*, was killed from a tree in deep forest. The plumage agrees in many points with Grant's description of the young male,² but for the present this identification must be considered provisional.

Muscadivores chalybura (Bonaparte).

This "balud," or imperial pigeon, was fairly abundant until a typhoon swept the island during the night of October 24. After that date not a bird of this species was heard. Possibly they moved to a part of the island where the trees were less damaged. September 14 a male bird was shot from a nest containing a single, heavily incubated egg. The nest had been built in a large tree at a height of about 10 meters. The egg is pure white and measures 46.5 by 32.3 millimeters.

I recently have seen two living examples of a pigeon from Bulacan Province, Luzon. I have no doubt these were *M. nuchalis* (Cabanis). This is a very distinct species with a large, well-defined patch of dark chestnut on the neck. A note on this species will be published as soon as specimens can be collected and compared with other material.

Myristicivora bicolor (Scopoli).

Early in October the nutmeg pigeon was found in some numbers near the barrio of Burdeos on the east coast, and specimens were collected at a later date near the town of Polillo.

COLUMBIDÆ.

Macropygia tenuirostris Bonaparte.

One male and one female were collected; the species seemed to be rare.

² *Ibis* (1895), 469.

PERISTERIDÆ.

Streptopelia dussumieri (Temminck).

This common species was usually found near the beach.

Chalcophaps indica (Linnaeus).

This widely distributed dove is known in Polillo by the name "u-man-ban."

Phlegoenas luzonica (Scopoli).

A male in molt, collected October 31, does not differ from typical specimens. This species is known in Polillo as "la-ga-ran."

RALLIDÆ.

Hypotaenidia torquata (Linnaeus).

A living, immature female was purchased September 24 and another was seen at a later date.

LARIDÆ.

Sterna sinensis Gmelin.

Two pairs of this little tern were killed September 7; the species was not noted again.

CHARADRIIDÆ.

Arenaria interpres (Linnaeus).

Two females were killed October 6 and others were seen subsequently.

Squatarola squatarola (Linnaeus).

Fairly common on tide flats and sandy beaches during October and November.

Charadrius fulvus Gmelin.

Two males in molt were taken, September 7 and 15, respectively.

Ochthodromus geoffroyi (Wagler).

Two females and one male were collected September 7 and one female November 4.

Ochthodromus mongolus (Pallas).

Four females were killed from a large flock on November 17.

Ægialitis dubia (Scopoli).

One male and one female.

Ægialitis peroni (Bonaparte).

One male was collected November 12.

Ægialitis alexandrina (Linnaeus).

One female killed November 8.

Numenius variegatus (Scopoli).

Not abundant; a male was collected September 11.

Totanus eurhinus (Oberholser).

One female was collected October 1.

Helodromas ochropus (Linnaeus).

One female was collected November 11.

Heteractitis brevipes (Vieillot).

The Polynesian tattler was one of the most abundant beach-birds; a specimen in mottled plumage was killed September 7.

Actitis hypoleucos (Linnaeus).

Fairly abundant.

Glottis nebularius (Gunnerus).

One female was killed from a flock November 3.

Rhyacophilus glareola (Linnaeus).

Three females were collected November 11.

Calidris leucophæa (Pallas).

One male was collected November 4.

Pisobia ruficollis (Pallas).

One female was collected November 4.

Gallinago megala Swinhoe.

Abundant during October and November; the native name is "u-suc-u-suc."

CEDICNEMIDÆ.

Orthorhamphus magnirostris (Vieillot).

One male, collected September 13, was the only individual seen on the island.

CICONIIDÆ.

Dissoura episcopus (Boddaert).

This species is known as "a-mo-bui" on Polillo; individuals were seen from time to time, but not one was killed.

ARDEIDÆ.

Egretta garzetta (Linnaeus).

Two specimens were collected.

Demigretta sacra (Gmelin).

Rare; one or two seen.

Nycticorax manillensis Vigors.

A few individuals seen in trees along small streams.

Butorides javanica (Horsfield).

Abundant.

Bubulcus coromandus (Boddaert).

Abundant in fields wherever carabaos were feeding.

Nannocnus eurhythmus (Swinhoe).

Two males were collected, September 30 and October 13, respectively.

ANATIDÆ.

Anas luzonica Fraser.

This mallard is known in Polillo as "pá-pan."

Spatula clypeata (Linnaeus).

Three shoveler ducks were killed November 1; this species is called "ba-li-uis."

FALCONIDÆ.

Astur trivirgatus (Temminck).

One immature male was collected September 26.

Accipiter gularis (Temminck and Schlegel).

An immature female was collected November 17.

Spilornis holospilus (Vigors).

One male was killed near the barrio of Burdeos.

Butastur indicus (Gmelin).

A few individuals noted.

Haliastur intermedius Gurney.

Occasionally seen.

Pernis ptilorhyncus (Temminck).

A female honey buzzard, taken September 30, is in immature plumage. Entire under parts white, lightly washed with buff; feathers of throat and fore breast with blackish shafts; forehead, cheeks, ear-coverts, and a wide band over each eye white; a large patch in front of each eye, and a smaller space behind each eye, blackish brown. Another female, in adult plumage, was collected October 2.

STRIGIDÆ.

Ninox philippensis Bonaparte.

One female was killed in deep forest; others were heard in coconut trees about the town.

CACATUIDÆ.

Cacatua hæmaturopygia (P. L. S. Müller).

Several hundred cockatoos roosted every night in a large, dead tree in the center of a rice field. This species is called "ca-lang-ai" in Polillo.

PSITTACIDÆ.

Tanygnathus lucionensis (Linnaeus).

Abundant.

Tanygnathus freeri sp. nov.

Specific characters.—Similar to *Tanygnathus everetti* Tweeddale, but much larger; wings and tail much longer; blue of the back lighter; green of the crown lighter; a distinct yellow collar on the hind neck.

Type.—No. 7219, adult male, Bureau of Science collection; collected near Polillo, Island of Polillo, November 8, 1909, by R. C. McGregor and

A. Celestino. Length, about 400 millimeters; wing, 235; tail, 170; chord of culmen from front of cere, 37; bill from nostril, 36; tarsus, 18. Upper mandible bright red, light yellow near the tip; lower mandible light orange-yellow; feet black.

Description.—Top and sides of head green; hind neck, sides of neck, chin, and throat golden-yellow, the yellow collar being quite distinct from the green occiput; interscapulars dark green, edged with blue; entire back and rump blue; tail-coverts green; rectrices green above, the tips narrowly golden-yellow, shafts black, below golden-yellow, shafts gray; exposed portions of wing-feathers green, shafts black, and more or less of the inner webs black; first primary with the entire inner web as well as much of the outer web black; median and greater secondary-coverts conspicuously edged with golden-yellow; below, wing-quills and greater under wing-coverts slate-black, very narrowly edged with yellow; lesser coverts, axillars, abdomen, flanks, and thighs green.

Female.—No. 7175, Polillo, Island of Polillo, October 21, 1909. McGregor and Celestino. The female is similar to the male. Length, 400 millimeters; wing, 230; tail, 165; chord of culmen from anterior margin of cere, 35; bill from nostril, 35; tarsus, 20. Bill white; iris bright red; legs and feet dirty, pale blue; nails horn-gray.

Freer's parrot was not detected until after the typhoon of October 24 and then it was found feeding in "camansi" (*Artocarpus camansi* Blanco) and "catmon" (*Dillenia philippinensis* Rolfe). The individuals observed by us were silent, thus presenting a marked contrast to the noisy Philippine green parrot, *T. lucionensis* (Linnaeus). This species is named for Dr. Paul C. Freer, director of the Bureau of Science, Manila.

Loriculus philippensis (P. L. S. Müller).

Our efforts to secure specimens of this species met with little success. Of the two males collected, one only has the red plastron on the breast. This specimen resembles *L. philippensis* of Luzon, except that there is no trace of orange behind the red forehead; this, if constant, would be a perfectly good specific character, but as it may be due to immaturity, I shall not attempt to found a species upon it.

CORACIIDÆ.

Eurystomus orientalis (Linnaeus).

Rare.

ALCEDINIDÆ.

Pelargopsis gigantea Walden.

Fairly common; one would expect to find *P. gouldi* Sharpe in Polillo, but a male *Pelargopsis*, collected October 2, is certainly *P. gigantea*, the light-colored species.

Alcedo bengalensis Gmelin.

Fairly abundant.

Alcyon cyanopterus (Jafresneye).

Four males and one female from Polillo do not differ from Mindoro and Masbate skins of this species.

Ceyx melanura Kaup.

Two males and two females are easily distinguishable from *C. mindanensis* Steere by their smaller size and much shorter bills.

Halcyon gularis (Kuhl).

One immature female was preserved.

Halcyon chloris (Boddaert).

One female was collected.

BUCEROTIDÆ.**Penelopides subnigra** sp. nov.

Specific characters.—Most nearly allied to *Penelopides manilla* (Boddaert), but noticeably larger with longer bill, wings, and tail. Back, rump, tail-coverts, and wings black, glossed with dark green, instead of being dark brown.

Type.—No. 7038, adult male, Bureau of Science collection. Collected near Polillo, Island of Polillo, September 19, 1909, by R. C. McGregor and A. Celestino. Wing, 260 millimeters; tail, 235; bill from nostril, 93.

The female is almost entirely black, thus resembling the females of *P. affinis* Tweeddale and *P. basilanica* Steere, but the rufous on the rectrices is confined to a small area near the middle of the tail as in *P. manilla* (Boddaert).

This hornbill is abundant in Polillo; it was often found feeding on the fruit of a species of *Ficus* § *Urostigma* and on the fruit of a tree belonging to the genus *Dysoxylum*.

MICROPODIDÆ.**Collocalia marginata** Salvadori.

Salvadori's swiftlet was abundant in and near the town of Polillo and was found nesting in a small cave near Burdeos; nests containing young birds were examined October 5.

Tachornis pallidior McGregor.

This palm swift was noticed only in the town of Polillo. Specimens of this species and of *Collocalia marginata* were knocked down with bamboo poles in front of our house.

TROGONIDÆ.**Pyrotrogon ardens** (Temminck).

Fairly abundant in deep forest; one male was collected.

CUCULIDÆ.

Centropus unirufus (Cabanis and Heine).

Six specimens from Polillo are darker in color than one specimen from Bataan Province, Luzon. The species is abundant in Polillo.

Centropus viridis (Scopoli).

Rare.

Dasylophus superciliosus (Cuvier).

Abundant.

PICIDÆ.

Chrysocolaptes hæmatribon (Wagler).

Fairly abundant; two females were collected.

Lichtensteinipicus funebris (Valenciennes).

Very rare; one male was collected.

HIRUNDINIDÆ.

Hirundo gutturalis Scopoli.

Two immature males were collected in September.

MUSCICAPULIDÆ.

Hemichelidon griseosticta Swinhoe.

Rare; one female September 29.

Cyornis philippinensis Sharpe.

Abundant; in one male, collected September 4, the flanks and basal tail-coverts are washed with reddish orange, thus approaching *Cyornis mindorensis* Mearns.

Hypothymis occipitalis (Vigors).

Abundant; one male was collected.

Rhipidura nigritorquis Vigors.

Abundant; one young male was collected.

Xeocephus rufus (Gray).

Two males and one female.

CAMPOPHAGIDÆ.

Artamides striatus (Boddaert).

Fairly abundant; specimens from Polillo do not differ from others taken in Luzon.

Pericrocotus cinereus Lafresneye.

One specimen was killed November 1; others were seen a few days earlier.

Lalage niger (Forster).

Fairly abundant.

PYCNONOTIDÆ.

Irena cyanogastra Vigors.

Abundant; many specimens were collected and do not differ from others from Luzon.

Iole gularis (Pucheran).

This fruit thrush fed in great numbers at a species of *Ficus* of the section *Urostigma*. Other birds feeding on the fruit of the same tree were: *Irena*, *Phapitreron*, *Poliolophus*, and *Penelopides*. In Polillo the fruit thrush is known as "tu-tu-riac."

Poliolophus urostictus (Salvadori).

A very common species.

TURDIDÆ.

Petrophila manillensis (J. R. Forster).

First seen on September 22 when a male was killed.

Kittacincta parvimaculata sp. nov.

Specific characters.—Similar to *Kittacincta luzoniensis* (Kittlitz), but the terminal white spots on the rectrices much shorter. On the outermost pair the spots are 7 to 8 millimeters, when measured on the shafts (in *K. luzoniensis*, 13 millimeters); on the second pair, about 7 millimeters (in *K. luzoniensis*, 13 millimeters); a trace, or no white, on the third pair; no white on the fourth pair. In *K. luzoniensis* the white spots are always well developed on three, usually on four, pairs of outer rectrices. White superciliary stripes about as wide as in *K. luzoniensis*, but not united across the forehead in any of the eleven males from Polillo.

Type.—No. 7151, adult male, Bureau of Science collection; collected in Polillo, October 15, 1909, by R. C. McGregor and A. Celestino. Wing, 76 millimeters; tail, 77; culmen from base, 18.5; tarsus, 25.

SYLVIIDÆ.

Acanthopneuste borealis (Blasius).

Rare.

ARTAMIDÆ.

Artamus leucorhynchus (Linnaeus).

Abundant; native name, "man-da-ra-git."

LANIIDÆ.

Otomela lucionensis (Linnaeus).

A female, collected October 30, is probably *O. lucionensis*, but two males, collected October 2 and September 23, respectively, seem to be much nearer *O. cristata*.

DICAËIDÆ.

Dicaeum xanthopyglum Tweeddale.

A very abundant species, indistinguishable from Mindoro specimens. This flowerpecker feeds at the flowers of *Conocephalus violaceus* (Blanco) Merrill and also at the fruit of *Ficus minahassæ* Miquel.

Dicaeum pygmæum (Kittlitz).

Two females were collected.

NECTARINIIDÆ.

Æthopyga flavipectus Grant.

Grant's sunbird was found in abundance. Immature males were taken throughout September, and three males, collected late in October, show gray on the sides of the throat.

Cinnyris sperata (Linnaeus).

Fairly abundant.

Cinnyris jugularis (Linnaeus).

Abundant in mangrove-swamps.

MOTACILLIDÆ.

Motacilla melanope Pallas.

First specimens obtained September 10; rather abundant in rice-land; known to the residents of Polillo as "pi-yug-yug."

Budytes leucostriatus Homeyer.

Rare and shy; first seen early in October.

Anthus rufulus Vieillot.

Fairly abundant in rice-land.

Anthus gustavi Swinhoe.

First specimen was collected September 29.

PLOCEIDÆ.

Munia jagori Martens.

Abundant; a nest with four eggs was found late in September.

Uroloncha everetti (Tweeddale).

Abundant.

ORIOLIDÆ.

Oriolus acrorhynchus Vigors.

Abundant.

DICRURIDÆ.

Dicrurus balicassius (Linnaeus).

The only specimen of *Dicrurus* collected, a female, appears to be of this species.

STURNIDÆ.

Lamprocorax panayensis (Scopoli).

Flocks of glossy starlings were noted several times, but none was collected.

Sarcops calvus (Linnaeus).

The only specimen of bald starling from Polillo is intermediate between *S. calvus* and *S. melanonotus*.

CORVIDÆ.

Corone philippina (Bonaparte).

Abundant.

DESCRIPTIONS OF FOUR NEW SPECIES OF FISHES FROM BANTAYAN ISLAND, PHILIPPINE ARCHIPELAGO.

By ALVIN SEALE.

(From the Section of Fisheries, Biological Laboratory, Bureau of Science, Manila,
P. I.)

Chaetodon carens Seale, sp. nov.

Head 3.10; depth 1.75; eye 2.80 in head; snout 3.25; interorbital 3; dorsal XIII, 21; anal III, 17; scales 7-38-20, the scales are larger on middle of sides; maxillary 4.50 in head, its distal end under nostril. Body slightly more elongate than is usual in this genus, strongly compressed, length of caudal peduncle 1.10 in its depth. Head of moderate size, characterized by the large eye, and short pointed snout; profile from tip of snout to origin of dorsal forms an angle of about 45° , the line from tip of snout to nuchal region is straight, slightly concave on the shoulder; the depth of the fish at origin of dorsal 1.75 in length to end of vertebra; origin of soft dorsal and origin of anal about on line. Mouth small; teeth brush-like in several rows, slightly projecting; gill openings wide, being carried forward to below eye; nostrils small, close together, in front of eye; gill rakers few, short and weak; dorsal spines rather long and saber-like, the third, fourth, and fifth the longest, the fourth 1.30 in head; dorsal and anal rounded; the origin of anal midway between middle of opercle and end of caudal vertebra; the second anal spine is the strongest and equal in length to the third spine, its length 1.50 in head; origin of ventrals midway between origin of anal and middle of cheeks, its tip extending slightly past anal pore; pectorals 1.10 in head.

Color in alcohol sepia-brown; no ocular band; nuchal region and top of head slightly darker, being a clove-brown; a wide black band on middle of spinous dorsal extends back and occupies almost the entire anal, except a narrow white tip and a small portion at the base of the anal spines; caudal yellow with a slight dusky wash on its posterior third; ventral brown with some indistinct yellowish blotches; pectorals yellowish white.

Type, No. 6173 in collection of Bureau of Science, from Bantayan Island, P. I. Length, 108 millimeters.

Chaetodon adiergastos Seale, sp. nov.

Head 3; depth at middle of dorsal 1.30; eye 3 in head; snout 3; interorbital 3; dorsal XII, 26; anal III, 21; scales 4-31-14; maxillary 4, its tip below nostril. Body short, deep, and strongly compressed; scales large on sides, small on head, soft dorsal, anal, and base of caudal. Head small, the profile steep, concave; snout small and pointed, its length about equal to width of eye; mouth small; teeth setiform, in several rows in each jaw, somewhat curved and projecting; nostrils small, close together and in front of eye; interorbital space slightly convex; gill openings large, being carried forward to below middle of eye; gill rakers few, short and weak; dorsal spines short and strong, the middle ones the longest, about 1.80 in head; soft dorsal rounded, similar to anal; origin of anal midway between anterior margin of eye and tip of caudal, the second anal spine strong and equal in length to the third which is slim; caudal truncate, its length 1.75 in head; ventrals midway between middle of cheek and origin of anal, the tip extending beyond the anal pore, the axil with an elongate scale; pectorals slightly less than head. Lateral line arched and high, ending at posterior angle of dorsal.

Color in alcohol is yellowish with numerous oblique brown lines extending down and forward over the entire side, each line marking the center of a row of scales, a jet-black ocular band of greater width than eye, the band not uniting above with its fellow, and its lower margin ending on the suboperculum. This band is very distinct and sharply defined, and is without marginal white borders, although the opercles and chin are almost white. On the shoulder midway between the first dorsal spine and the interorbital space is a small black saddle, not connected with the ocular band. Snout yellow, unmarked; soft dorsal and anal brown, with dark tips which have a rather narrow band across the posterior yellowish white area, basal third of fin brown; ventrals yellowish with some very indistinct darker blotches; pectorals yellowish.

Type, No. 5800 in collection of Bureau of Science, from Bantayan Island, P. I. Length, 116 millimeters. Also cotype No. 5791, length 111 millimeters.

This species is related to *C. flavirostris* Günther, but lacks the wide, dusky band from dorsal to anal which characterizes that species. Our species is more distinctly striped than *C. xanthurius* Bleeker. It differs also in having a wide ocular band and in being distinctly striped, the stripes running obliquely forward over the entire sides. It also has no "broad yellow band occupying the posterior part of the body," and neither the ocular band nor the saddle is bordered by a white line.

Amblygobius insignis Seale, sp. nov.

Head 3.60; depth 4.70; eye 4 in head; snout 4.10; maxillary 2.50; interorbital less than width of pupil; dorsal VI, 13; anal 13; scales 60-70 in lateral series. Head naked; no barbules; no serri. Teeth in two

or more rows with an outer row of enlarged curved canines in the anterior part of each jaw. Tongue rounded, not adnate to floor of mouth. Head rounded, angle of mouth under anterior third of eye.

Body oblong compressed; depth of caudal peduncle 2.30 in head; its length 1.75 in head. No hair-like filaments at upper part of pectorals. Origin of dorsal fin midway between tip of snout and base of sixth dorsal ray, the second, third and fourth dorsal spines slightly elongate, the second spine the longest, being almost equal to head; anal similar to soft dorsal, its longest ray 2.10 in head, its origin under the second ray of soft dorsal, its posterior rays not reaching to caudal; caudal rounded, 1.10 in head; ventrals fully united, their origin midway between tip of snout and origin of anal, their length 1.25 in head, their tips not reaching to anal opening; pectorals 1.10 in head.

The color markings of this species are very striking and characteristic, the posterior half of the body being covered with oblique bands of brown alternating with yellowish. These run downward and backward at an angle of about 70° ; the yellow bands are slightly less in width; below the spinous dorsal they are broken up. The coloring of the belly is lighter, with about six narrow white lines which extend entirely around the belly and nearly to the median line on sides. Two oblique narrow dusky lines extend forward across cheeks and around the throat, the anterior one just back of angle of jaw; some small black dots scattered over head and shoulders; about three very indistinct darker bands over nuchal region. Spinous dorsal yellowish with a dusky stripe near the margin and some dusky punctulations at base, soft dorsal with the alternating brown and yellowish bands of body extending into the fin and forming the markings; caudal grayish with indistinct yellowish vertical lines; some black dots on upper portion of fin; anal yellowish, the distal half black in which color are small scattered yellow dots; ventrals grayish, with a dusky wash on the posterior portion of the interior; pectorals yellowish, slightly darker at base.

Type, No. 5779 in collection of Bureau of Science, from Bantayan Island, P. I. Length, 58 millimeters. One specimen.

Amia griffini Seale, sp. nov.

Head 2.50 (including opercular flap); depth 2.25; eye 3.10 in head; snout 4.50; interorbital space 4; dorsal VII, 19; anal II, 8; scales 2-26-7; lateral line complete; two rows of scales on cheeks; posterior limb only of preopercle serrated. Mouth large, oblique, the maxillary ending under middle of eye; minute teeth in jaws, vomer and palatines; gill rakers rather long and strong, 15 on lower arch; gill openings large, being carried forward to below anterior third of eye. •

Body oblong, compressed, the depth appearing greater than is usual in members of this genus; depth of caudal peduncle 1.25 in its length. Head deep and pointed, the profile almost straight; fins long, the soft

dorsal with the three anterior rays elongate, greater than length of head; first dorsal spine very minute, the second 1.30 in eye, the third and fourth the longest, 1.85 in head; origin of anal midway between base of caudal and posterior margin of eye, its second spine equal to width of orbit, its longest ray 1.75 in head; origin of ventrals on a line with origin of first dorsal, its rays reaching anal spines, its length 1.30 in head; pectorals 1.50 in head.

General color in alcohol mars-brown; yellow on belly; margins of the scales on sides above belly are shaded with minute brown dots. There is a very indistinct indication of five or six narrow dark stripes on the middle of the rows of scales anteriorly, scarcely to be distinguished in the cotypes; no marking on head; a brownish blotch on base of pectorals; a small black dot on base of caudal just above the lateral line, one of the cotypes is without dot. Dorsal fin grayish, the spinous dorsal slightly darker on margin; caudal yellowish, the margin grayish; anal yellowish at base shading into grayish on outer half; ventrals yellowish, their margins grayish; pectorals yellowish.

Type, No. 5701 in collection Bureau of Science, from Bantayan Island, P. I. Length, 125 millimeters. Cotypes, Nos. 5696 and 5698, from same locality. Length, 124 and 135 millimeters.

Named in honor of Dr. L. E. Griffin, the collector.

ILLUSTRATIONS.

PLATE I.

- FIG. 1. *Chatodon carcus* Scale.
2. *Chatodon adiergastos* Scale.

PLATE II.

- FIG. 1. *Amblygobius insignis* Scale.
2. *Amia griffini* Scale.

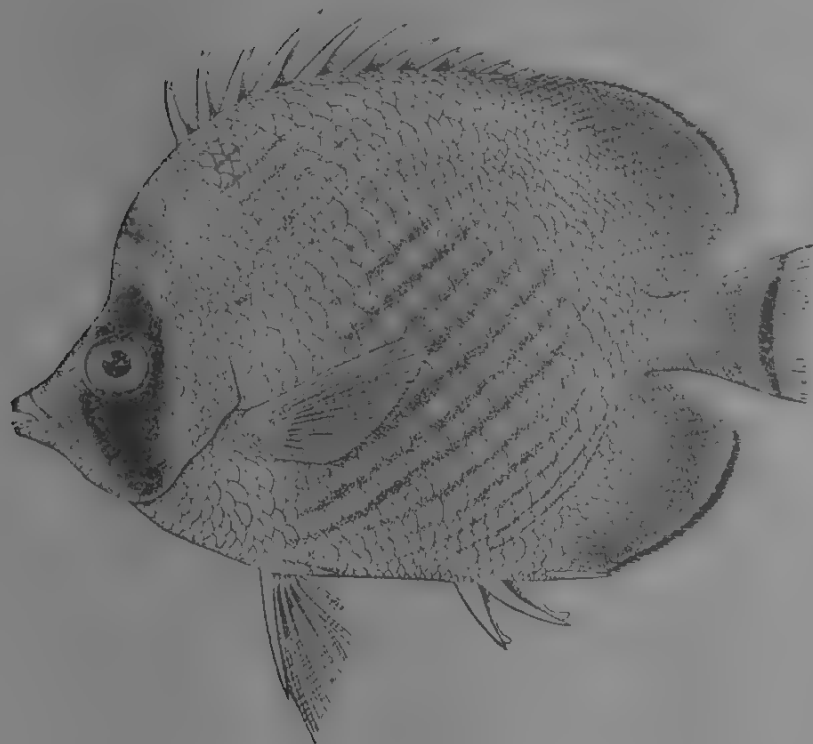
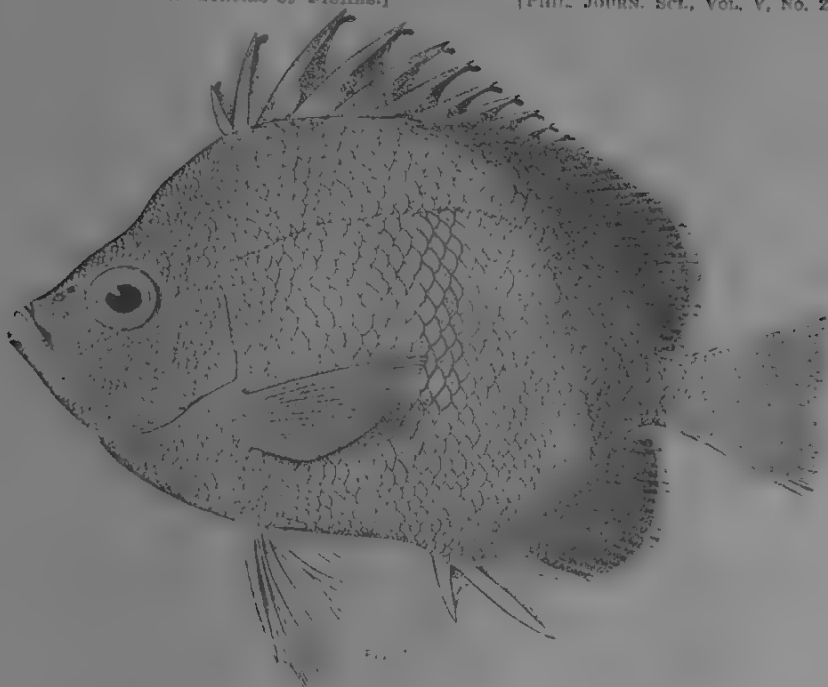


FIG 2

PLATE I.

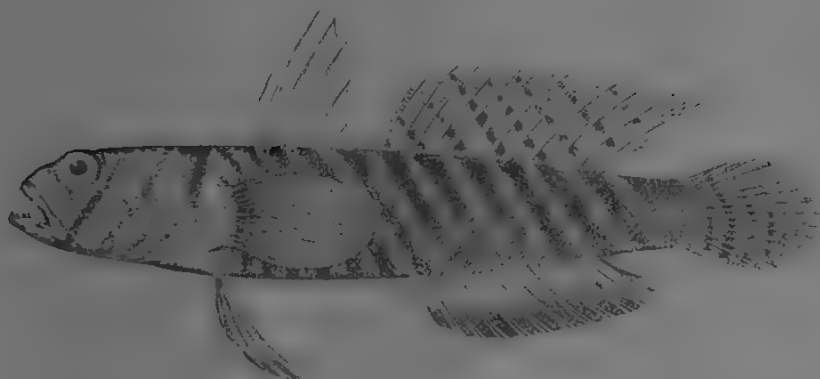


FIG. 1.

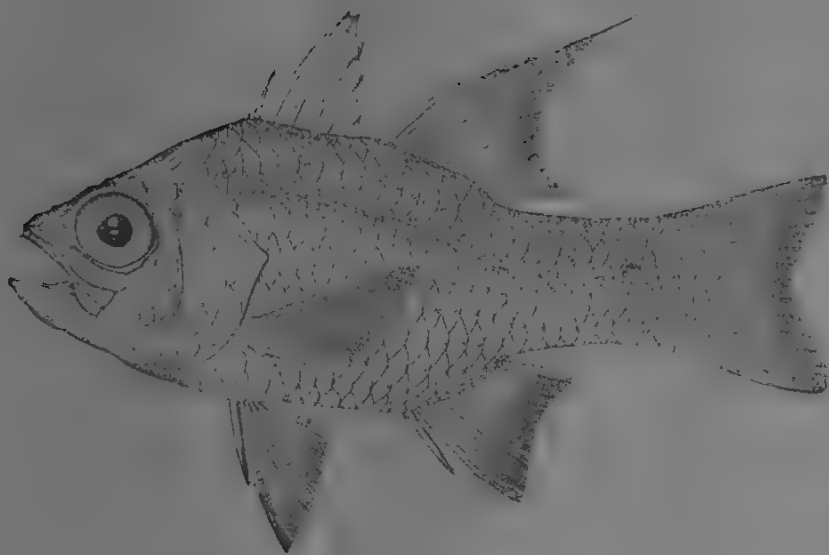


FIG. 2.

FOURMIS DES PHILIPPINES.

Par A. FORBES.

(Yverne, Switzerland.)

Les fourmis énumérées ci-dessous et décrites font partie d'une collection reçue de M. Charles S. Banks, Entomologiste du Gouvernement au Bureau of Science à Manille, avec l'addition d'une espèce de l'île Sumatra récoltée par feu le Dr. Moesch.

1. *Odontomachus banksi* sp. nov.

♀ Long. 13 à 14 mill. Mandibules lisses, longues de presque 2 mill., ayant à l'extrémité 3 dents pointues, dont l'intermédiaire ou préapicale est la plus courte. Leur bord interne a de 3 à 4 fortes dents vers l'extrémité et de 6 à 8 petites dents vers la base. Tête longue de 3.5 mill., et large de 2.5 à la hauteur des yeux et de 2.0 à l'occiput. Bord antérieur de l'épistome presque droit. Yeux ovales, allongés dans le sens oblique. Sillon occipital profond. Bord postérieur de la tête non relevé en collerette; tête fortement échancrée derrière. Le scape dépasse le bord occipital de 2 fois son épaisseur. Second article du funicle $1\frac{1}{2}$ fois plus long que le premier. Mésonotum fortement et largement échancré, comme chez les *O. rixosus* et *papuanus* Em. Face déclive de l'épinotum très courte et abrupte. Nœud conique, n'ayant qu'un seul pan antérieur de la base au sommet de l'épine. Celle-ci longue et pointue, un peu courbée en arrière. Le pan postérieur présente sur le profil une convexité médiane en feston à chacun de ses bords. Une large dent en dessous, devant.

Lisse et luisant. Front strié en long de stries divergentes qui atteignent la portion postérieure des profondes fossettes antennaires. Les fossettes latérales d'Emery n'ont qu'une fine punctuation espacée. Thorax assez mat, transversalement strié; les stries de l'épinotum plus grossières, celles du pronotum fines et serrées, parfois longitudinales au milieu. Pilosité dressée, nulle sauf deux ou trois poils jaunes sur la tête et l'abdomen. Une pubescence jaunâtre, oblique soulevée et assez abondante, mais espacée, se trouve partout sur le corps et sur les membres.

Tête d'un roux jaunâtre. Thorax et écaille d'un brun noirâtre; abdomen d'un noir brunâtre. Mandibules, antennes, tarses et articulations des pattes roux. Hanches, cuisses et tibias d'un jaune testacé clair.

Très voisin du *papuanus* Em., dont il diffère surtout par sa tête plus grande et plus large et par sa couleur.

Luzon, Province of La Laguna, Mount Banajao, P. I. (*Charles S. Banks* collector).

Type No. 7181 dans la collection entomologique du Bureau of Science, Manila, P. I.

2. *ODONTOMACHUS INFANDUS* Sm. ♀

Correspond assez bien à la description de Smith et montre une tendance du nœud du pédicule à prendre devant une forme ressemblant à celle de *l'imperator* Emery. Les stries de l'occiput sont superficielles et la tête derrière légèrement plus étroite que chez le *papuanus* dont il est bien voisin. Je ne connais pas le vrai *savissimus*, qui, m'assure M. Emery, diffère du *papuanus* par sa tête plus longue et plus étroite derrière.

NEGROS OCCIDENTAL, Pinalayan, Bago, P. I. (6908 *Banks*).

3. *ODONTOPONERA TRANSVERSA* Sm. ♀

NEGROS OCCIDENTAL, Nakalang, Bago, P. I. (35 *Banks*); MINDANAO, Camp Keithley, P. I. (7319 *Mrs. M. S. Clemens*).

4. *DIACAMMA RUGOSUM* LeGuill. subsp. *GEOMETRICUM* Sm. ♀

MINDANAO, Province of Davao, Davao, P. I. (2219 *E. B. Copeland*).

4. *DIACAMMA RUGOSUM* LeGuill. subsp. *GEOMETRICUM* Sm. var. *VRIDIPURPUREA* Emery.

Luzon, Province of Rizal, Montalban, P. I. (5321 *Banks*).

6. *Platythyrea inermis* sp. nov.

♀ Long. 5.2 mill. Mandibules subopaques, densément ponctuées et pubescentes, longues, à bord terminal très distinctement denticulé et bien plus long que le bord interne. Epistome et front formant une forte convexité antéro-postérieure, sans sutures. Bord antérieur de l'épistome en arc convexe. Yeux assez plats, plutôt grands, situés en avant du milieu des côtés. Tête rectangulaire, médiocrement élargie derrière, à côtés médiocrement convexes et à bord postérieur faiblement échancré. Le scape atteint à peu près le bord postérieur de la tête. Les articles 6 à 10 du funicule sont un peu plus épais que longs. Suture pronésonotale profonde; suture mésoépnotale nulle. Dos du thorax à peine convexe. Face déclive de l'épinotum haute, abrupte, concave, régulièrement bordée en ovale de côté et en haut, sans trace de dent, ni de tubercule, ni d'angle. Nœud du pédicule aussi haut que le 1^{er} segment de l'abdomen, plus haut que long, mais un peu plus long qu'épais, verticalement tronqué devant et derrière, mais à face antérieure convexe, tandis que sa face postérieure est concave et bordée comme la face déclive de l'épinotum, mais obtusément. Abdomen médiocrement étranglé entre ses deux premiers segments; le 2^{me} un peu plus long que le 1^{er}. Hanches postérieures sans trace d'épine.

Densément et finement ponctuée, subopaque ou à peu près mate. La ponctuation superposée (espacée) n'est pas grossière; elle est distincte, régulièrement espacée et luisante sur la tête, moins distincte sur le pédicule et à la base de l'abdomen, très effacée ou nulle ailleurs. Pubescence pruinée extrêmement fine assez abondante partout, sans être très dense.

Noire. Pattes, funicules, mandibules et arêtes frontales d'un brun rougeâtre, devant de l'épistome et scapes bruns.

LUZON, Province of Rizal, Montalban Gorge, P. I. (*Charles S. Banks*, collector).

Type No. 5131 dans la collection entomologique du Bureau of Science, Manila, P. I.

7. *SOLENOPSIS GEMINATA* Forel, subsp. *RUFA* Jerdon ♀ ♂.

NEGROS OCCIDENTAL, Maaao, P. I. (878 *Banks*); LUZON, Manila, P. I. (3133 *Banks* and 8931 *P. L. Jones*).

8. *PHEIDOLOGETON DIVERSUS* Jerdon ♂

LUZON, Manila, P. I. (4200 *Banks*).

9. *Monomorium floricola* Jerdon, var. *philippinensis* var. nov.

♀ Identique à la forme typique. Tout au plus l'échancrure thoracique est elle un peu plus faible et les nœuds sont ils un peu plus comprimés d'avant en arrière, moins épaissement arrondis au sommet.

♀ Long. 3.2 à 3.3 mill. Plus grande, surtout plus robuste que l'espèce typique et d'un brun unicolore, avec les pattes et les antennes (sauf la massue et les cuisses brunes) jaunâtres. Epinotum plus court. Second nœud bien plus comprimé, plus court et plus large, moins arrondi.

La femelle se distingue de prime abord du *floricola*, tandis que l'ouvrière est bien difficile à différencier.

LUZON, Manila, P. I. (*Charles S. Banks*, collector).

Type No. 5862 dans la collection entomologique du Bureau of Science, Manila, P. I.

10. *MONOMORIUM (MARTIA) ORIENTALE* Mayr ♂

NEGROS OCCIDENTAL, Nakalang, Maaao, P. I. (47 *Banks*).

11. *Monomorium (Martia) banksi* sp. nov.

Long. 1.4 mill. Légèrement plus grand que l'*atomus* Forel, mais plus petit que l'*orientale* Mayr. Mandibules lisses, plus larges que chez l'*atomus*. Epistome armé de deux carènes plus aiguës, divergeant beaucoup moins en avant. Tête rectangulaire, un peu plus longue que large, distinctement échancrée derrière, à côtés pas ou à peine convexes. Yeux avec une dizaine de facettes, comme chez l'*atomus*. Antennes de 11 articles, comme chez l'*atomus*. Nœuds presque anguleux au sommet, moins arrondis que chez l'*atomus* et beaucoup moins que chez l'*orientale*.

Entièrement lisse et luisant, avec quelques poils dressés épars comme chez l'*atomus* (moins que chez l'*orientale*).

Entièrement d'un jaune sale ou brunâtre un peu moins foncé que chez l'*orientale*, mais bien moins vif que chez l'*atomus*. Pattes et antennes d'un jaune plus pâle. Les ondes transversales un peu plus brunes, à peine perceptibles au milieu de segments abdominaux. Du reste comme l'*atomus*.

Intermédiaire entre *atomus* et *orientale*, mais avec les carènes de l'épistome plus vives et les nœuds plus anguleux que chez ces deux espèces.

♀ Long. 3 mill. D'un brun jaunâtre clair, avec l'extrémité des segments abdominaux, les pattes et les antennes d'un brun jaune pâle. Premier nœud, vu de profil, conique, le 2^{me} bien plus large que long (tous deux arrondis, le 2^{me} aussi long que large chez l'*atomus* var. *integrius*). L'épinothum beaucoup plus court que chez l'*atomus*. Tête bien plus étroite et plus allongée que chez l'*orientale*.

Moins grêle que l'*atomus*, mais beaucoup plus petite et plus grêle que l'*orientale*.

NEGROS OCCIDENTAL, Nakalang, Maa, P. I. (Charles S. Banks collector).

Type ♀ ♂ No. 53 dans la collection entomologique du Bureau of Science, Manila, P. I.

12. *CREMATOGASTER DEFORMIS* Sm. ♂

MINDANAO, Province of Davao, Davao, P. I. (2214 E. B. Copeland).

13. *CREMATOGASTER ROGENHOFFERI* Mayr ♂ ♀ ♂

MINDANAO, Province of Davao, Davao, P. I. (2220 E. B. Copeland).

14. *CREMATOGASTER SIMONI* Emery ♂

LUZON, Manila, P. I. (3041 Banks).

15. *Cremastogaster subnuda* Mayr, subsp. *politula* Forel, var. *tagala* var. nov.

♀ Long. 2.7 mill. Très voisine de la var. *ruginota* Forel de l'Inde, et avec la même sculpture sur le thorax, mais les épines épinothales sont bien plus longues, le premier nœud est un peu plus large et plus court, et la couleur plus foncée (tête et abdomen d'un brun foncé; thorax et pédicule d'un rouge brun).

♀ Long. 5.6 mill. D'un brun roussâtre. Abdomen d'un brun plus foncé. Epinothum presque absolument inerme ou avec deux tubercules très obtus. Plus petite espèce. Ailes hyalines. (La ♀ de la var. *ruginota* n'est pas connue; celle de la subsp. *politula* typique est noire, faiblement subdentée à l'épinothum et longue de 7 mill.).

♂ Long. 2.3 mill. D'un jaune brunâtre sale; tête d'un brun noir. Plus petit et plus grêle que celui du *politula* typique, et avec l'épinothum subopaque, finement sculpté (celui du *politula* est noir et a l'épinothum luisant et les ailes plus longues).

Il est fort possible que la var. *ruginota* doive être élevée au rang de sous-espèce et séparée ainsi de *politula*, auquel cas la var. *tagala* devra se

rattacher non au *politula* typique, dont il diffère beaucoup, mais au *ruginota*.

LUZON, Manila, P. I. (*Charles S. Banks* collector).

Type ♂ ♀ § No. 2792 dans la collection entomologique du Bureau of Science, Manila, P. I.

16. *Cremastogaster modiglianii* Emery, var. *clemensae* var nov.

§ Long. 2.7 à 3.2 mill. Diffère de la forme typique par sa sculpture plus faible (derrière de la tête luisant) et de la var. *annamita* Em., en outre par l'absence de la petite carène médiane du pronotum qu'on voit chez cette dernière (dont la couleur est en outre plus foncée et la sculpture plus forte que chez la forme typique).

MINDANAO, Camp Keithley, P. I. (*Mrs. M. S. Clemens* collector).

Type § No. 5537 dans la collection entomologique du Bureau of Science, Manila, P. I.

17. *Vollenhovia oblonga* Sm., subsp. *dispar* subsp. nov.

§ Long. 3.2 mill. Mandibules plus courtes et plus larges que chez le type de l'espèce, armées de 6 dents, et de forme nettement triangulaire, formant un angle net entre le bord terminale et le bord interne. Les carènes de l'épistome sont plus élevées, moins divergentes devant et plus prolongées en arrière que chez la subsp. *levithorax* Em.; pronotum plus déprimé et plus épaulé devant; premier nœud du pédicule plus court, plus large que long, avec un pan antérieur absolument vertical (oblique chez *levithorax*). Pattes entièrement d'un rouge jaunâtre. Du reste comme la subsp. *levithorax*.

♀ Long. 8 mill. Mandibules armées de 7 dents, ponctuées. Tête en trapèze, rétrécie devant, un peu plus large derrière qu'elle n'est longue. Thorax plus large que la tête. Tête striée-ridée en long; les rides divergent en arrière et leurs intervalles sont rugueux, subopaques. Thorax avec de rides longitudinales effacées et des séries de points allongés entre deux; une bande médiane, longitudinale lisse. Epinotum et une partie des nœuds irrégulièrement ridées. Abdomen lisse, à points épars, piligères très fins.

Noire. Bord antérieur de la tête, mandibules, antennes et pattes rougeâtres. Ailes brunes, avec une cellule cubitale allongée et une cellule discoïdale. Du reste comme l'ouvrière.

♂ Long. 3.8 mill. Mandibules courtes, étroites, jaunes, obtusément unidentées. Tête arrondie derrière, au moins aussi large que longue. Epistome très convexe et proéminent. Les yeux occupent la moitié antérieure de la tête. Antennes de 13 articles. Scape long comme les 3 premiers articles du funicule pris ensemble. Ceux-ci sont courts, presque aussi épais que longs; les quatre ou cinq derniers sont longs, formant une massue fort indistincte. Thorax plus large que la tête. Epinotum et tête assez mats densément et finement sculptés. Le reste

plus ou moins lisse et ponctué. Sauf sur le dos de l'abdomen, la pilosité dressée brun roussâtre est plus abondante que chez les ♂ et ♀.

D'un noir un peu brunâtre. Pattes brunes. Articulations, mandibules et antennes jaunâtres. Ailes d'un brun plus clair que chez la ♀. Cellule discoidale distincte.

La ♀ est beaucoup plus grande, presque double de celle de l'espèce typique d'après Smith et Emery. Les caractères génériques du ♂ correspondent assez bien à ceux indiqués par Mayr (var. *samoensis*).

Luzon, Province of La Laguna, Mount Banajao, P. I. (*Charles S. Banks* collector).

Type ♂ ♀ No. 7189 dans la collection entomologique du Bureau of Science, Manila, P. I.

18. *Vollenhovia banksi* sp. nov.

♀ Long. 1.8 à 2 mill. Mandibules lisses, luisantes, assez triangulaires, avec trois dents peu distinctes sur la partie antérieure de leur bord terminal que est à peu près tranchant derrière elles. Epistome court, avec une faible impression médiane. Tête rectangulaire d'un bon sixième plus longue que large, à peine rétrécie derrière. Le scape atteint ou dépasse un peu le quart postérieur de la tête. Chassue très distinctement de 3 articles, dont les deux derniers fort renflés. Bord postérieur de la tête faiblement échancré. Yeux médiocres légèrement en arrière du tiers antérieur de la tête. Arêtes frontales très courtes. Thorax allongé, à dos subdéprimé, presque rectiligne sur son profil d'avant en arrière (à peine convexe). Sutures très peu marquées, la promésnotale presque obsoleté. Pas trace d'échancrure. La face basale de l'épinotum bien plus longue que large et plus longue que la face déclive. Premier nœud plus long que large. Second nœud légèrement plus large que long. Cuisses médiocrement renflées, bien moins que chez la *subtilis* Emery.

Tête et pronotum à peu près mats, finement et densément ridés en long; épistome luisant avec peu de rides. Une raie luisante et lisse à la place du sillon frontal; milieu du pronotum, devant, un peu luisant. Mésonotum à la fois ridé et réticulé. Epinotum, côtés des nœuds et côtés du mésonotum mats et densément réticulés—ponctués. Abdomen, sommet des nœuds et pattes lisses. Tout le corps, les pattes et les scapes recouverts d'une pubescence jaunâtre oblique (soulevée), assez abondante, quoique espacée. Pilosité dressée jaunâtre, fine pointue, éparse sur le corps, nulle sur les tibias et les scapes.

Corps et cuisses bruns; pattes, antennes et mandibules d'un jaune sale.

NEGROS OCCIDENTAL, Nakalang, Maao, P. I. (*Charles S. Banks* collector).

Type ♀ No. 67 dans la collection entomologique du Bureau of Science, Manila, P. I.

19. *DOLICHODERUS BITUBERCULATUS* Mayr ♂LUZON, Manila, P. I. (4490 W. *Schultze*).20. *DOLICHODERUS PATENS* Mayr subsp. *PUBIVENTRIS* Emery ♀ ♂PALAWAN, Iwahig, P. I. (8897 F. W. *Forworthy*).

Cette forme constitue, plus ou moins, un intermédiaire entre *patens* Mayr, dont elle a la sculpture, et *semirugosus* Mayr, dont elle a la couleur; mais l'abdomen est plus pubescent que chez tous les deux.

21. *PRENOLEPIS LONGICORNIS* Latr. ♀ ♂(Cosmopolite. LUZON, Manila, P. I. (2890 *Banks*).22. *PLAGIOLEPIS LONGIPES* Jerdon ♀.NEGROS OCCIDENTAL, Pinalayan, Bago, P. I. (6907 *Banks*).23. *CAMPONOTUS (COLOBOPSIS) VITREUS* Smith ♀ ♂.LUZON, Province of Zambales, Olongapo, P. I. (12860 *Banks*).24. *CAMPONOTUS (COLOBOPSIS) PUBESCENS* Mayr ♂LUZON, Province of Lepanto-Bontoc, Cervantes, P. I. (8790 *Banks*).25. *CAMPONOTUS MACULATUS* Fabr. subsp. *PALLIDUS* Sm. ♂LUZON, Manila, P. I. (2579 *Banks*).26. *CAMPONOTUS MACULATUS* Fabr. subsp. *SUBNUBUS* Em. ♀ ♂LUZON, Manila P. I. (2506 W. *Schultze*).27. *CAMPONOTUS QUADRISECTUS* Sm. ♂LUZON, Province of La Laguna, Santa Maria, P. I. (8606 H. M. *Curran*).28. *Camponotus horrens* sp. nov.

♂ Long. 5.5 mill. Mandibules lisses, luisantes, étroites, armées de 5 dents; l'angle entre le bord interne et le bord terminal très obtus. Epistome très convexe, subcaréné au milieu, à bord antérieur bécancré, sublobé entre les échancrures, faiblement imprimé au milieu dudit bord antérieur. Aire frontale bien plus large que longue, mal délimitée en arrière. Sillon frontal remplacé par une carène longitudinale assez courte. Arêtes frontales plutôt courtes, très divergentes. Tête large, fort convexe, trapézoïdiforme, à côtés convexes, fortement rétrécie devant, au moins aussi large derrière que longue, à bord postérieur presque droit. Yeux convexes, situés au quart postérieur de la tête. Le scape dépasse le bord occipital des 2/5 à la moitié de sa longueur. Thorax conformé comme chez le *C. serguttatus* Fabr., mais encore plus profondément échancré entre le mésonotum et l'épinotum. Ce dernier forme une bosse allongée, dont l'extrémité antérieure, arrondie en haut, tombe en haute marche d'escalier sur la suture méso-épinotale. Vue de dessus cette bosse est subdéprimée, plus longue que large, mais à peine plus étroite que le mésonotum; face déclive mal délimitée, plus courte que la face basale.

Quoique un peu plus haute et à bord supérieur plus arrondi (plus obtus), l'écaille a la forme de celle du *C. quadrilaterus* Mayr; très épaisse en bas, avec un pan antérieur vertical très court, puis avec une surface oblique montant au bord supérieur, et enfin avec un pan postérieur haut et vertical. Abdomen court; pattes longues, sans piquants. Tibias cylindriques.

Luisant, superficiellement et peu distinctement réticulé; épinothum sub-opaque, transversalement chagriné. Des points piligères espacés fort distincts et formant de petites élévations, surtout sur la tête, le thorax et les membres. Tout le corps, les pattes et les scapes hérissés de longs poils grossiers et pointus, d'un brun foncé, en partie presque noirâtres vers leur base, plus clairs à l'extrémité, très abondants sur l'épinothum, les tibias et les scapes. En outre une pubescence fauve dispersée partout ailleurs, mais assez abondante sur l'abdomen où elle forme un léger duvet.

Entièrement d'un brun roussâtre, rappelant beaucoup celui des *Myrmicaria eumenoides* Gerst et *brunnea* Saunders. Abdomen d'un brun foncé.

L'analogie de couleur, de forme, de pilosité, d'éclat et de taille avec la *Myrmicaria brunnea* qui habite les mêmes parages est telle que je soupçonne fortement cette espèce d'être minétique et d'avoir quelque relation correspondante avec la *Myrmicaria brunnea*.

LUZON, Province of Rizal, Montalban Gorge, P. I. (*Charles S. Banks* collector); NEGROS OCCIDENTAL, Mailum, Bago, P. I. (6906 *Banks*).

Type ♀ No. 5433 dans la collection entomologique du Bureau of Science, Manila, P. I.

29. *ECHINOPLA STRIATA* Smith ♂.

NEGROS OCCIDENTAL, Pinalayan, Bago, P. I. (6909 *Banks*).

30. *POLYRHACHIS CYANIVENTRIS* Smith ♀ ♂.

LUZON, Province of Rizal, Montalban Gorge, P. I. (5427 *Banks*); MINDORO, Mount Halcon, P. I. (6232 *E. D. Merrill*).

♂ Long. 11.2 mill. Du reste toute semblable à l'ouvrière. Ailes brunes. Les scapes de cette espèce, très large et robuste, sont fortement renflés à l'extrémité chez la femelle et l'ouvrière, ce que Smith et Mayr n'ont pas mentionné.

31. *POLYRHACHIS ARMATA* LeGuillon ♀.

NORTH CAMIGUIN ISLAND, P. I. (7791 *R. C. McGregor*).

32. *POLYRHACHIS SCULPTURATA* Smith ♀ ♂.

NEGROS OCCIDENTAL, Mailum, P. I. (6070 *Banks*).

33. *POLYRHACHIS BIHAMATA* Drury ♂.

NEGROS OCCIDENTAL, Mount Canlaon, Tabidiao, P. I. (5719 *Banks*).

34. *POLYRHACHIS SEXSPINOSA* Latr. var. *ESURIENS* Em., ♂.

NEGROS OCCIDENTAL, Nakalang, Maa, P. I. (2170 *Banks*).

35. *Polyrhachis bicolor* Smith. var. *concolor* var. nov.

♀ Diffère du type de l'espèce par sa couleur entièrement noire, avec les antennes, les mandibules, les pattes et tout au plus la base de l'abdomen d'un brun un peu roussâtre. Tout le corps, y compris l'abdomen, est recouvert d'une pelisse argentée aussi brillante que celle de *l'acantha* var. *argentea*. Du reste la forme et les épines grêles sont identiques à celles du type de la espèce. La ♀ et le ♂ sont comme l'ouvrière, avec les ailes enfumées de brunâtre et les nervures brunes. Chez le ♂ la pubescence est diluée.

Luzon, Manila, P. I. (*Charles S. Banks* collector).

Type ♂ ♀ No. 4224 dans la collection entomologique du Bureau of Science, Manila, P. I.

36. *Polyrhachis textor* Smith var. *aequalis* var. nov.

♀ Long 4.6 à 5.2 mill. Correspond bien exactement à la description de Smith, mais les trois épines de l'écaille sont de longueur égale.

♀ Long. 6.5 mill. Pronotum avec deux angles obtus; épinothum avec deux larges dents, fortes et obtuses. Les 3 épines de l'écaille de longueur égale. Ailes jaunâtres, avec les nervures et la tache marginale jaunes.

Luzon, Province of Zambales, Olongapo, P. I. (*Charles S. Banks* collector); NEGROS OCCIDENTAL, Maa, P. I. (866 *Banks*).

Type ♀ No. 12869 dans la collection entomologique du Bureau of Science, Manila, P. I.

Camponotus mœschi sp. nov.

♀ Long. 4.5 mill. Mandibules assez luisantes, finement chagrinées et abondamment ponctuées, assez étroites, armées de 5 dents au bord terminal et d'un denticule au bord interne. Epistome caréné avec un lobe arrondi devant. Tête peu large en trapeze peu marqué, plus longue que large, médiocrement élargie derrière, à bord postérieur convexe. Yeux grands, au tiers postérieur. Le scape dépasse le bord postérieur d'un bon tiers. Arêtes frontales divergentes; aire frontale transversale; sillon frontal peu distinct. Suture promésonotale profonde, constituant une échancrure distincte, quoique faible, du dos du thorax. Echancrure mésoépinothale moins profonde que chez le *C. horrens* (moins abrupte surtout), environ comme chez le *sexguttatus* (♀ major), mais l'épinothum est un peu plus court, plus convexe d'avant en arrière, et plus comprimé, beaucoup plus étroit que chez l'*horrens*, nullement déprimé dessus (sans face supérieure distincte). Face déclive légèrement concave, plus courte que le dos ou face basale. Ecaille mince, comprimée, à bord supérieur subrectiligne. Abdomen court; pattes plutôt grêles; tibias cylindriques, sans piquants.

Luisant, superficiellement et peu distinctement chagriné (épinothum inclusivement), avec les mêmes points piligères élevés que chez l'*horrens*. Pilosité dressée jaunâtre, pointue, assez abondante et longue sur l'ab-

domen et le derrière de la tête, plus courte sur le thorax et le devant de la tête. Les tibias et les scapes n'ont qu'une pilosité oblique (demi couchée) et courte. Pubescence adjacente presque nulle.

Entièrement d'un roux jaunâtre, en partie un peu brunâtre; funicules et pattes d'un jaune roussâtre, ainsi que l'épistome et les joues.

SUMATRA, récolté par feu le Dr. Moesch. J'avais pris cette espèce autrefois pour le *C. nutans* Mayr, mais c'est autre chose. Elle est parente du *C. horrens*, mais néanmoins bien différente. Les ♀ sont toutes de même grandeur (♀ minor ou media?).

Type dans ma collection.

A NEW ACCESSORY FOR DISSECTION WORK.

By CHARLES S. BANKS.

(From the Entomological Section, Biological Laboratory, Bureau of Science,
Manila, P. I.)

In the course of my studies in insect anatomy, I have had occasion to use a small, easily made piece of apparatus with such excellent results that I believe it to be worth noting, especially as I have never seen mention of a similar accessory.

This apparatus is especially adapted for such delicate work as that of differentiating the parts of the alimentary canal and the reproductive organs in small, adult insects such as *Bombyx mori* Linn.; and it also serves admirably for all kinds of larvæ and for larger adult insects: Arachnida, Lumbricidæ, Cestodea, Nematodea and Myriapoda, as well as for small vertebrates, the dissection of which could be performed in normal salt solution, or other similar liquid.

The apparatus is really nothing more than the classical pin of our school days, fashioned on slightly different lines from that well-known weapon of offense and defense, and is made from brass or nickel insect pins No. 3 or No. 5. I have used two styles of this pin, one in which the base forms two sides of an equilateral triangle, the other in which the triangular base is complete. (See Plate I, *a* and *b*.) A bend is made 5 to 10 millimeters from the point so as to form an angle of 60°; the other bends are made so that when completed the point comes over the center of the triangular base. The only advantage in using style *a* is that the base is larger and somewhat greater stability is thereby secured.

The subject to be dissected is cut open, laid in normal salt solution in the dissecting pan with paraffine in the bottom, and the flaps of integument are stretched open and fastened with ordinary pins.

With a number of the bent pins at hand, lying loose upon the paraffine, one may begin tearing away any part desired, the trachea probably first demanding attention. As each part is freed, a bent pin is seized by the forceps and its point hooked under a loop of the tissue. The bent pin is then gently pulled away as far as possible and set down upon its base on the paraffine. As other parts are dissected, successive bent pins are

used. Where overlapping parts occur it is an easy matter to release them, pick them up from beneath and drop the bent pin where most convenient for holding the tissue apart. While its own weight and the adhesion of the base of the bent pin to the paraffine are amply sufficient to hold the tissues apart, yet it can so easily be moved that there is practically no danger of tearing important organs by an inadvertent pull with the forceps, and in this lies the chief value of this method.

I have found that organs as delicate and as intricately enmeshed in tracheæ as are the ovaries or the abdominal nerve fibers and ganglia of *Bombyx mori* Linn., and *Attacus ricini* Boisd., may be admirably dissected by the use of the bent pin, whereas an attempt to hold them with ordinary pins stuck into the paraffine would result in disaster to the specimen. Another value of this apparatus is that it may be picked up with the engaged tissue and moved here and there at will and with greater dispatch than if ordinary pins were used. There is also no danger of pinning the part into the paraffine.

Perhaps a no less useful feature of the bent pin is that it may be used most successfully in glass vessels, e. g., Petri dishes, where obviously no other method of holding tissues could be devised.

This apparatus will be found particularly useful in the class room or in the anatomical laboratory where a lack of skill on the part of students would be compensated for by a diminished liability to spoil specimens upon which hours of careful dissection had been spent. In making the apparatus it is better to use the pointed end of the pin for a hook, as the tissue can be more readily slipped off.

Plate I shows several of these bent pins in use in the dissection of a silkworm in a Petri dish.

ILLUSTRATION.

PLATE I. *a* and *b*, showing different methods of using bent pins in dissection work.

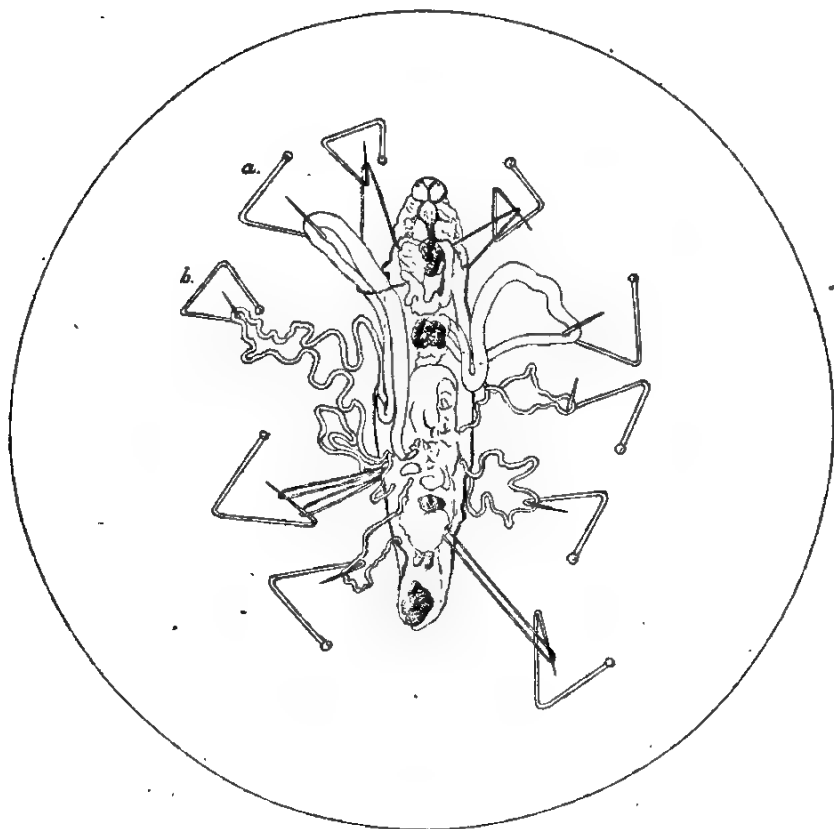


PLATE I.

BIRDS FROM PAUAI AND MOUNT PULOG, SUBPROVINCE OF BENGUET, LUZON.

By RICHARD C. MCGREGOR.

(From the Ornithological Section, Biological Laboratory, Bureau of Science, Manila, P. I.)

INTRODUCTION.

Pauai, or Haight's, is some 56 kilometers from Baguio, near the main mountain trail between Baguio and Bontoc, in the subprovince of Benguet, Luzon, and has an approximate elevation of 2,250 meters. The trail is built through forests of island pine, *Pinus insularis* Endl., while the vegetation about Pauai is the mossy forest, characteristic of many mountain tops in the Philippine Islands.

The change in the flora from pine forest to mossy forest is very abrupt and the line of demarcation between the two is as distinct as can be imagined. The trunks and branches of the trees are covered with masses of ferns, orchids, lichens, and mosses producing a striking and characteristic appearance and many of the shrubs, grasses, and other small plants are of genera different from those inhabiting the pine woods.¹

During May and June, 1908, with my assistant, Andres Celestino, I made a collection of birds at Pauai. Of the twenty-two species collected or noted in the mossy forest, only two, *Pyrrhula leucogenys* Grant and *Rhinomyias insignis* Grant, appear to be confined to the mossy forest, as all of the others have been collected at lower altitudes. The poverty of the avian fauna of these high mountains is emphasized when it is remembered that seventy-two species were recorded from Irisan, near Baguio.

In July we spent three days collecting in the mossy forest on Mount Pulog, a peak some 10 kilometers east of Pauai and 2,800 meters in elevation. On our return from Mount Pulog we were detained for a few days at Lutab, a barrio of Cabayan, elevation about 1,000 meters. Very few birds were noted in the vicinity of Lutab. *Hirundo striolata* (Boie) was seen on July 5 and 6, an immature male of *Chaimarrornis*

¹ This Journal Sec. C (1910) 5, Nos. 4, 5, with a paper on the flora of Mount Pulog by Merrill and Merritt, will be found plates showing some of the botanic and physiographic features of this section of Benguet.

bicolor Grant was collected, and the following species were seen in some numbers: *Iole gularis* (Pucheran), *Cacomantis merulinus* (Scopoli), *Anthus rufulus* Vieillot, *Cisticola exilis* (Vigors and Horsfield), *Munia cabanisi* Sharpe, and *Pycnonotus goiavier* (Scopoli).

BIRDS OF PAUAI.

***Prioniturus montanus* Grant.**

Abundant; many specimens.

***Batrachostomus microrhynchus* Grant.**

One male, collected June 4, is in the gray phase of plumage. Wing, 140 millimeters; tail, 111; bill from nostril, 14; greatest width of bill, 30; internasal line, 16; tarsus, 17. The stomach contained beetles.

***Collocalia* species.**

Swiftlets were frequently seen, but it was impossible to obtain specimens of them.

***Yungipicus validirostris* Blyth.**

This little woodpecker was not uncommon.

***Chrysocolaptes hæmatribon* (Wagler).**

One pair of this species was collected.

***Thriponax javensis* (Horsfield).**

Seen but once.

***Muscicapula westermanni* Sharpe.**

Westermann's flycatcher is represented in this collection by two adult males, and one male and one female in spotted plumage.

***Muscicapula luzoniensis* Grant.**

One female was taken June 12.

***Rhipidura cyaniceps* (Cassin).**

Fairly abundant and usually found in flocks with other species of small birds.

***Rhinomyias insignis* Grant.**

Very rare; one male was collected June 15. Length, 170 millimeters. Iris light brown; bill black; legs and feet lead-blue.

***Culicicapa ceylonensis* (Swainson).**

Two males collected.

***Cryptolopha nigrorum* Moseley.**

This inconspicuous little bird was one of the most abundant species recorded.

***Eumylas nigrimentalis* (Grant).**

The black-masked verditer flycatcher was abundant. Many specimens, both immature and adult, were collected.

***Zosterornis whiteheadi* Grant.**

Whitehead's tree babbler was very abundant and was often observed in company with other small birds.

***Brachypteryx poliozona* Grant.**

Very abundant, but shy and difficult to collect. A young female, May 24, may be described as follows: Above dark brown; feathers of the crown, nape, sides of neck, and breast with rusty-brown median lines; chin and throat rusty-brown; no blue anywhere in the plumage.

***Planesticus thomassoni* (Grant).**

Very abundant. A young male, with tail just showing, has the plumage nearly all black; head, neck, and throat black; middle of lower breast and abdomen with shaft-lines of rusty-brown; feathers of abdomen, thighs, and under tail-coverts fringed with rusty brown.

***Horornis seebohmii* (Grant).**

The plumage of young birds differs somewhat from that of the adult. Above blackish-brown, head like the back; under parts dusky olive-brown; chin and middle of abdomen light ochraceous-brown.

***Cephalophonus validirostris* (Grant).**

Three specimens collected; not common.

***Hyloterpe albiventris* Grant.**

Fairly abundant; three males collected.

***Pardaliparus elegans* (Lesson).**

This titmouse is one of the most conspicuous elements in the flocks of small birds seen in the mossy forest. A young male, collected May 24, has the upper plumage suffused with dark olive-green; below yellow, throat and chin yellow, but with a dark streak along each side of the throat.

***Callisitta mesoleuca* (Grant).**

Very common in flocks of small birds.

***Pyrhula leucogenys* Grant.**

This bullfinch is one of the few birds the range of which is limited to the mossy forest. Two, three, or four individuals were usually observed together and feeding, nearly always, in the larger evergreens. Single birds could at times be attracted by imitating their plaintive whistle. Iris dark brown; legs and feet clay-color or pale flesh-color; nails gray; bill mostly black, more or less of the basal portion of the lower mandible yellowish white. The young is similar to the adult, but crown and nape brown, slightly darker than the back; the white cheek-patch small and ill-defined; chin brown like the throat.

BIRDS OF MOUNT PULOG.

Prioniturus montanus Grant.

Several individuals seen in the mossy forest.

Collocalia whiteheadi Grant.

A small flock of swiftlets was seen near the summit of the mountain. The single specimen collected is doubtfully identified with *C. whiteheadi*. Compared with skins from Irian, Benguet, this specimen is somewhat darker and more blackish on the head and back, while the wing is shorter. A smaller species of swiftlet was noted, possibly it was *C. isonota*.

Rhipidura cyaniceps (Cassin).**Cryptolopha nigrorum** Moseley.**Eumylas nigrimentalis** Grant.

These three species of flycatchers were more or less abundant in the mossy forest.

Iole gularis (Pucheran).

Several fruit thrushes were noted near the Igorot barrio of Ankiki, just below the mossy forest.

Zosterornis whiteheadi Grant.

Two specimens collected July 3.

Brachypteryx poliozona Grant.

Several seen in the mossy forest.

Planesticus thomassoni (Seeborn).

One specimen collected July 4.

Horornis seebornii (Grant).

A young spicemen was caught with an insect net, near the base of the mountain.

Zosterops whiteheadi Hartert ?

A female silvereye, killed near Ankiki, is doubtfully referred to *Z. whiteheadi*.

Pyrrhula leucogenys Grant.

A pair of bullfinches was collected near timber-line and others were seen.

VERZEICHNISS VON COLEOPTEREN AUS DEN PHILIPPINEN,
NEBST ZWEI NEUEN ARTEN AUS NIEDERLÄNDISCH
OSTINDIEN.

Von. J. WEISE.
(Berlin, Germany.)

Herr W. Schultze, Assistent-Entomolog am Bureau of Science in Manila, welcher seinen Urlaub in Europa verlebt, brachte eine Anzahl von Coleopteren zur Bestimmung mit, die in den Philippinen gefangen wurden. Von den Chrysomeliden und Coccinelliden gebe ich hier eine Aufzählung in der die im Cataloge von Baer nicht genannten Arten mit einem * versehen sind.

I. CHRYSOMELIDEN.

- *1. *DONACIA WIEPKENI* Ws., Arch. f. Nat. (1898), 178.

LUZON, Province of Tarlac, Tarlac, P. I. (4638 C. S. Banks).

- *2. *LEMA SEMPERI* Jac., Ann. Soc. Ent. Belg. (1893), 267; var.

Flügeldecken einfarbig metallisch grünlich-blau; Spitze der Schienen und Tarsen schwärzlich.

BATANES ISLANDS, Calayan, P. I. (944 R. C. McGregor).

- *3. *CRIOCEERIS SEMIPUNCTATA* Fabr., Syst. Eleut. (1801), 1, 472.

ROMBLON, P. I. (1985 R. C. McGregor).

- *4. *Phytorus latus* sp. nov.

Subrotundus (♀) vel transversim rotundatus (♂), fulvescens, capite prothoraceque obscure aut saturate brunneo-rufis, hoc crebre punctato, juxta marginem anticum sublaevi, elytris prothorace duplo latioribus, punctulato-striatis, intersticiis convexiusculis, stria duodecima integra. —Long. 6 mm., lat. ♂ 7, ♀ 5.5 mm.

ROMBLON, P. I. (R. C. McGregor collector).

Type No. 1973, in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Von den übrigen Arten durch den sehr breiten Körperbau, besonders aber durch den Verlauf des zwölften Punktstreifens ausgezeichnet. Derselbe bildet bei den typischen Arten nur einen Strich, der bald hinter der Schulter erlischt, in der vorliegenden Art ist er vollständig,

höchstens fehlt zuweilen eine Spur an der Basis; hinten verbindet er sich regelmässig mit dem dritten Streifen.

Gerundet, fast so breit (♀), oder breiter als lang (♂), hell und lebhaft bräunlich rotgelb, glänzend, Fühler mehr rostrot, Kopf und Thorax hell kastanienbraun, letzterer nach hinten zu allmählich dunkler. Kopfschild und Stirn sehr fein gewirkt und verloschen punktiert, die Trennungslinie zwischen beiden und die Augenrinnen schmal, doch scharf und tief. Thorax halb so breit als die Flügeldecken, hinten fast dreimal so breit als lang, nach vorn in mässiger Rundung stark verengt, oben schwach querüber gewölbt, aber in den Vorderwinkeln stärker abfallend, dicht punktiert. Die Punkte sind nahe dem Vorderrande und auf einem grösseren Raume in den Vorderecken flach, verloschen und weiter auseinander gerückt. Schildchen gross, flach, hinten kurz, doch scharf zugespitzt, zart gewirkt. Flügeldecken mit regelmässigen feinen, aber scharfen und tiefen Streifen, in denen sehr kleine Punkte stehen. Letztere fallen dadurch mehr in die Augen, dass ihre nächste Umgebung dunkel durchscheint. Der erste (abgekürzte) Streifen ist mässig lang, der siebente und der achte sind vorn nach innen gebogen und dann nahe der Schulterbeule abgekürzt, der neunte und zehnte vereinigen sich weit hinter der Schulter mit einander, der elfte nähert sich dicht hinter der Schulter dem achten bedeutend. Der abgesetzte Seitenrand ist dachförmig, ähnlich wie bei den Cassiden, beim ♀ kaum ein drittel so breit, beim ♂ ziemlich so breit als die Scheibe der Flügeldecken und fällt mit der Scheibe fast in einer Flucht ab. Er ist nicht dicht punktiert, die Punkte scheinen bei gewissem Lichte dunkel durch. Beim ♂ sind die Tarsen der Vorderbeine etwas erweitert.

5. *CORYNODES INDAGACEUS* Chev., Rev. et Mag. Zool. (1841), 228.

LUZON, Province of Benguet, Irian River, P. I. (1300 *R. C. McGregor*).

6. *COLASPOSOMA* species.

7. *AULACOPHORA QUADRIMACULATA* Chap., Ann. Soc. Ent. Belg., Bull. (1876), 19, 100.

NEGROS OCCIDENTAL, Maao; LUZON, Province of Rizal, Montalban Gorge, P. I. (277, 5564 (*C. S. Banks*)).

8. *AULACOPHORA ROSEA* Chap., Ann. Soc. Ent. Belg., Bull. (1876) 19, 99.

LUZON, Province of Benguet, Irian River, P. I. (1299 *R. C. McGregor*).

*9. *HOPLASOMA PHILIPPINENSIS* Jac., Ann. Soc. Ent. Belg. (1894), 197.

Der Bauch ist nur in der Mitte schwarz, an den Seiten blass gelblich gesäumt, der erste Bauchring ganz, sowie der Hinterrand der folgenden Ringe gelblich. Der zweite Ring trägt in der Mitte einen breiten, dicken pechschwarzen Anhang, der hinten in zwei lange, dicke, allmählich zugespitzte Zähne endet. Diese sind an der Spitze rötlich gelb, der

ganze Anhang ist dicht gerunzelt, sehr dicht behaart und erscheint daher rauh. Die *Hoplasomen* lassen sich überhaupt an der mannigfaltigen Bildung des Bauchanhanges beim ♂ sicher unterscheiden.

LUZON, Province of Pampanga, Mount Arayat, P. I., 2,500 feet (2977 W. Williamson).

In Allard's Tabelle, Ann. Soc. Ent. Fr. (1888) 327, ist die Angabe unter *g*¹: "Philippines 5. *picifemora* All." an eine falsche Stelle geraten; sie muss hinauf an den Satz unter *g* gerückt werden, wonach die Anmerkung Jacoby's, Ann. Soc. Ent. Belg. (1896) 271 unten und p. 272 unter *H. abdominalis* zu berichtigen ist. Zugleich muss in dieser Arbeit, pp. 271-273 für *Haplosoma* immer *Hoplasoma* gelesen werden.

10. HAPLOSONYX SPECIOSUS Baly., Ann. Mag. Nat. Hist. (1879), (5) 3, 113.
Ein Exemplar mit einfarbig weisslichgelben Fühlern.

SIBUYAN ISLAND, P. I. (2001 R. C. McGregor).

11. HAPLOSONYX ?SMARAGDIPENNIS Chevz., Rev. Zool. (1839) 288.

LUZON, Province of Benguet, Irian River, P. I. (1070 R. C. McGregor).

*12. CNECODES SUTURALIS Motsch., Etud. Ent. (1858) 100.

Ein ♀. Von Birma beschrieben, über Vorder- und Hinterindien, China, etc., verbreitet. Das ♀, welches der Autor nicht erwähnt, hat in der Regel nur Glied 8 und 9 der Fühler weisslich.

LUZON, Manila, P. I. (4868 C. S. Banks).

13. MENIPPUS VIRIDIS Duvivier, Ann. Soc. Ent. Belg., Bull. (1884), 28, 315.

NEGROS OCCIDENTAL, Maaao, P. I. (327 C. S. Banks).

14. Monolepta (Candezea) bifoveolata sp. nov.

♂ Oblongata, fulvo-rufa, nitida, antennis articulis 3-7 nigris, 8-11 flavis, articulo ultimo apice infuscato, tibiis apice tarsisque infuscatis, capite laevi, prothorace subquadrato obsolete punctulato, elytris subtilissime punctatis, singulo fovea sublaterali ante medium impressis. — Long. 5.8 mm.

MINDORO, Rio Baco, P. I. (R. C. McGregor collector).

Type No. 3393 in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Die Fühler sind ziemlich so lang als der Körper, Glied 3 ist doppelt so lang als 2, 4 länger als 3 und etwas kürzer als 1, die folgenden sind dem 4ten ähnlich; die beiden ersten Glieder sind rostrot gefärbt wie der Körper, 3-7 nicht besonders tief schwarz, 8-11 weisslichgelb, die Spitze des letzten Gliedes und der Schienen, sowie die Tarsenangedunkelt. Thorax wenig breiter als lang an den Seiten hinter der Mitte leicht verengt, auf der Scheibe verloschen und sehr fein punktiert, in der Mitte jederseits leicht eingedrückt. Schildchen glatt. Flügeldecken an der Basis nicht ganz doppelt so breit wie der Hinterrand des Thorax, bis ein viertel der Länge leicht erweitert, dann ziemlich parallel, im letzten

Viertel wieder etwas verengt und hinten gerundet abgestutzt; sehr fein punktiert und in den Zwischenräumen mit zahlreichen noch feineren Pünktchen besetzt. Jede Decke hat hinter dem ersten Viertel der Länge über dem Seitenrande eine gerundete Grube, deren Umgebung etwas wulstartig erhöht, äusserst dicht und fein punktiert und ziemlich matt ist. Die Grube ist tief, aber viel kleiner wie beim ♂ von *cavipennis* Baly. Hinterschienen mit mässig langem Enddorne, Metatarsus beinahe halb so lang als die Schiene.

15. *SPHAERODERMA* species.

Ein Exemplar, einer gelbbraunen Art, deren Fühler vom fünften Gliede ab schwärzlich gefärbt sind.

*16. *PSYLLIODES SPLENDIDA* Harold, Deutsche Ent. Zeit. (1877), 364.

LUZON, Manila, P. I. (2466 C. S. Banks).

*17. *PHYLLOTRETA SERRICORNIS* Duviv., Stett. Ent. Zeit. (1885), 46, 387.

Ein ♀. Nach der Grösse, Färbung und namentlich nach der Form der weissen Längsbinde jeder Flügeldecke dürfte das vorliegende Exemplar zu dieser Art gehören, die nur nach dem ♂ beschrieben ist. Beim ♀ sind die Fühler einfach, Glied 2 und 3 klein, 3 unbedeutend länger als 2, 4 und die folgenden dicker als die beiden vorhergehenden, allmählich bis zum 6ten Gliede verbreitert, dann gleichbreit, Glied 4 so lang als 2 und 3 zusammen, 5 und die folgenden etwa so lang als 4, nur das Endglied etwas länger.

NEGROS OCCIDENTAL, Nakalang, P. I. (1148 C. S. Banks).

*18. *Blepharida manilensis* sp. nov.

Elongata, dilute ferruginea, elytris citrinis, ferrugineo- vel brunneo-variegatis, prothorace ante medium dilatato, hic illic parce punctato, basi sulco brevi, antice sulco longo apice bifurcato impresso, prosterno basi subtruncato. Long. 11–12 mm.

SIBUYAN ISLAND, P. I. (R. C. McGregor collector).

Type No. 1913 in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Nach der Beschreibung mit *Bl. flavopustulata* Baly von Assam am nächsten verwandt, aber der Thorax mit gut ausgeprägten punktierten Furchen versehen, ähnlich wie bei der kleineren *Bl. xanthospilota* Baly aus China.

Der Körper ist schlank gebaut, namentlich beim ♂, hell rotbraun, die vier Vorderbeine und die Fühler blasser, die Flügeldecken citronen- oder weisslichgelb, mit zahlreichen, unregelmässigen rotbraunen Flecken bestreut, welche teilweise der Quere nach, oder schräg unter einander verbunden sind; die Punkte in den regelmässigen Reihen ebenfalls rotbraun. Zuweilen nimmt die dunkle Färbung so zu, dass auf der Scheibe nur zahlreiche kleine, gelbe Fleckchen übrig bleiben, während

die Basis fast zusammenhängend gelb gefärbt ist und auch der letzte Zwischenstreifen zwei grössere gelbe Makeln trägt. Die Stirn ist sehr fein punktiert, die gebogenen Stirnrinnen sind tief und scharf und setzen die glatten Beulen über der Fühlerwurzel scharf ab. Thorax mehr als doppelt so breit wie lang, die Seiten von der Basis bis zur Mitte ziemlich parallel, dann im Bogen erweitert und nach den Vorderecken wieder verengt, letztere wie gewöhnlich nach aussen vortretend. Die Scheibe ist vor der Mitte fast glatt, unter stärkerer Vergrösserung zart punktuert, hinter derselben jederseits von der Mittellinie mit einer Gruppe von kräftigen Punkten versehen; die Furchen sind tief, die an der Basis kurz, glatt, die vom Vorderrand ausgehenden lang, punktiert, noch vor der Mitte des Thorax gegabelt, ein Ast läuft gradlinig bis in den Seitenrand, der andere schräg nach hinten und innen. Die Punktstreifen der Flügeldecken sind wenig tief, die Zwischenstreifen fast glatt, eben.

19. *ASPIDOMORPHA MILIARIS* Fabr., Syst. Ent. (1775) 91.

Die hellste Form, aberration *flaveola*, liegt von den Philippinen zwar nicht vor, dürfte dort aber kaum fehlen, da sie überall mit der Stammform zugleich auftritt. Bei ihr besitzen die Flügeldecken nur wenige, kleine, punktförmige, schwarze Flecken, das Seitendach ist ganz ungefleckt, oder hat zwei bis fünf schwarze Punkte: 1, hinter der Basis, neben der Schulterbeule, 2 und 3 dahinter, neben einander nahe dem Ausserrande, und zwei ähnliche (4 und 5) hinter der Mitte, alle frei.

Übergänge zur typischen Form, bei der auf dem Dache 2 schwarze Querbinden liegen, bilden solche Stücke, bei denen entweder der 2te und 3te, oder der 4te und 5te Fleck sich der Quere nach vereinigt haben.

Häufig scheinen bei Manila Übergänge zur dunkelsten Form, der aberration *inundata*, zu sein, bei welcher zuletzt die Flügeldecken tief schwarz sind, ausgenommen ein grosser Fensterfleck auf dem Dache, von ein viertel der Länge bis hinter die Mitte, und eine kleine, gemeinschaftliche gelbe Makel am Schildchen. Stücke bei denen ausserdem das Seitendach im letzten Viertel, oder eine gemeinschaftliche Makel in der Mitte der Flügeldecken, oder noch mehrere punktförmige Makeln auf der Scheibe jeder Decke gelb sind, können ebenfalls schon zu dieser Farbenabänderung gerechnet werden.

20. *ASPIDOMORPHA* species.

Ein ♂ aus der Verwandtschaft von *dorsata* und *bilobata*, aber von diesen Arten durch längere Endglieder der Fühler verschieden. Bei den hierher gestellten Species hat Boheman ausser kleinen Farbenabweichungen eigentlich keine positiven Unterschiede genannt und sie bedürfen daher einer gründlichen Bearbeitung.

*21. *Laccoptera manilensis* sp. nov.

Subtriangularis, convexa, rufo-testacea, subopaca, antennis articulis 5 ultimis pectoreque macula postica utrinque nigris, prothorace in disco subtiliter aciculato-punctato, nigro bimaculato, elytris crebre-, interne substriato-punctatis et bicarinulatis, inacula subscutellari communi maculisque sex rotundatis in singulo nigris, protecto deflexo, crebre sat fortiter punctato.—Long. 7–7.5 mm.

Aberration a. *nigripennis*.

Elytris nigris, protecto maculis duabus rufescentibus, prima baseos, secunda in medio.

Luzon, Province of Benguet, Irian River, P. I. (*R. C. McGregor* collector).

Type No. 6360 in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Körpergestalt von *L. tredecimpunctata* Fabr., aber nach hinten etwas mehr verengt, auf den Flügeldecken ohne einen gemeinschaftlichen kleinen Höcker in der Spitze des Basalendreieckes und durchweg feiner punktiert, nur die zwei ersten Punktreihen sind ziemlich regelmässig, die beiden folgenden schon sehr gestört und die übrigen ganz verworren, auch die Zeichnung ist abweichend, namentlich dadurch, dass die vordere Randmakel und die daneben liegende Makel 3 nahe der Mitte der Scheibe gross und gerundet sind; *L. philippinensis* Boh. ist etwas glänzender als die vorliegende Art, auf den Flügeldecken ähnlich punktiert und mit der gleichen Zahl schwarzer Flecken gezeichnet, aber das Seitendach fällt weniger ab, ist weitläufiger und viel flacher punktiert und neben der Schulter, sowie zwischen den beiden Randmakeln convex aufgetrieben, ausserdem hinter der zweiten Makel weniger verengt aber tiefer von der Scheibe abgesetzt und die erste Randmakel tritt kaum auf das Dach hinaus.

Flügeldecken in den Schultern am breitesten, hierauf allmählich verengt und hinten gemeinschaftlich schmal abgerundet; auf ihnen befinden sich zusammen dreizehn gerundete schwarze Makeln, eine gemeinschaftliche vor der höchsten Stelle der Decken, breiter als lang, sowie sechs auf jeder Flügeldecke. Hiervon liegt Makel 1 auf dem vorderen Teile der Schulterbeule, 2 in der Seitengrube vor ein Drittel der Länge, mit dem grössten Teile auf dem Seitendache, 3 und 4 bilden mit ihr eine Schrägreihe nach hinten und innen, 3 ist gross, innen von der zweiten Rippe begrenzt, oder wenig darüber hinwegreichend, 4 klein, auf der ersten Rippe, 5 und 6 bilden eine weniger schräge, zuweilen fast grade Querreihe. Makel 5 befindet sich unmittelbar vor zwei Drittel der Länge auf dem Dache und reicht nur wenig auf die Scheibe hinauf, 6 zwischen der zweiten Rippe und der Naht.

Ofter verbindet sich Makel 3 mit 4; äusserst selten (Herr Schultze fand unter Hunderten von Exemplaren nur ein Stück) sind die Flügel-

decken schwarz, eine grosse, ziemlich dreieckige Makel in der Schulterecke, sowie der Raum des Daches zwischen den Normalmakeln 2 und 5 rotbraun. (ab. *nigripennis*).

Zwei ähnlichen Arten von Niederländisch Ostindien scheinen ebenfalls unbekannt zu sein:

22. *Laccoptera insulana* sp. nov.

Breviter ovalis, convexa, testacea, nitidula, antennis articulis 5 ultimis pectoreque utrinque macula postica nigra, prothorace disco obsolete reguloso-punctato, nigro-bimaculato, elytris crebre et fortiter punctato-striatis, rugosis, nigro-irroratis, protecto crebre rugoso, nigro-bimaculato. Long. 7 mm.

INSULA WETTA, Niederländisch Ostindien April, 1901.

Diese Art von der ich fünf Exemplar von Herrn Hauptmann Moser erhielt, und noch andere sah, lässt sich mit der mir unbekannten *sculpturata* Boh., aus Celebes nicht vereinigen, weil die drei Gruben an der Basis der Flügeldecken, die Boheman ausführlich beschreibt, nicht vorhanden sind, und die Körperform und die Zeichnung abweicht.

Der Umriss ist länglich oval, indem die Flügeldecken an der Basis nur mässig breiter sind als der Thorax, sich im ersten Viertel etwas erweitern, dahinter gradlinig und sehr wenig verschmälern, und erst im letzten Drittel stärker gerundet-verengt und hinten breit abgerundet sind. Auf der Scheibe sind sie stark in Reihen punktiert, die an einigen Stellen durch Querrunzeln gestört werden, welche die sehr schmalen, erhöhten Zwischenstreifen verbinden. Das Seitendach ist dicht querrunzelig, ohne deutlich hervortretende Punkte.

Hell rötlich gelbbraun, das Seitendach gelblich, die beiden schwarzen Makeln des Thorax ziemlich gross, auf jeder Decke sind fünf regelmässige Makeln, zwei auf dem Seitendache, gross und drei vor der Mitte der Scheibe, kleiner. Die erste Dachmakel liegt bald hinter der Schulterecke am Seitenrande, ist dreieckig, nach innen zugespitzt, und erreicht hier die 10te Punktreihe vor der normalen tiefen Grube. Über dieser liegt zwischen der 9ten und 6ten Reihe die dritte Scheibenmakel, die gewöhnlich etwas breiter als lang ist. Die beiden andern Scheibenmakeln sind gerundet, 1 vor der Schulterbeule, 2 vor der Spitze des Basaldreieckes, in der Regel frei. Ausserdem ist die Scheibe hinter der Mitte unregelmässig mit kleinen schwarzen Flecken bestreut, die aus der Vereinigung von 2 bis 3 schwarz gefärbten Punkten entstehen, auch der Spitzenwinkel ist mehr oder weniger breit schwarz. Die zweite Dachmakel liegt normal, reich vom Seitenrande bis zum 10ten Punktstreifen und ist meist viereckig.

23. *Laccoptera fallax* sp. nov.

Subrotundata, convexa; rufo-testacea, nitidula, protecto flavescente, antennis articulis 5 ultimis et plerumque maculis duabus metasterni nigris; prothorace disco sublaevi, nigro-bimaculato, elytris in disco crebre

et fortiter punctato-striatis, maculis parvis ceteris 22 signatis, protecto fortiter rugoso-punctato, maculis duabus magnis nigris, postica in discum nonnihil excurrente.—Long. 8 mm.

INSULA LARAT vel TENIMBER Niederländisch Ostindien (*Moser*).

Der vorigen sehr ähnlich und nahe verwandt, jedoch breiter gebaut und an den Seiten mehr gerundet, die Scheibe des Thorax fast glatt, das Seitendach dagegen stark und tief runzelig punktiert und die zweite Makel desselben bis in die 9te Punktreihe reichend und auf dem letzten Zwischenstreifen nach vorn ausgezogen. Die drei ersten Scheibenflecke sind ähnlich, nur liegt der erste mehr auf der Schulterbeule und weiter von der Basis entfernt, dahinter befinden sich noch acht kleine schwarze Flecken: zwei in der Mitte neben einander, drei hinter derselben und drei auf dem Abfalle zur Spitze. Diese selbst ist ebenfalls schwarz.

24. *METRIONA TRIVITTATA* Fabr., Syst. Eleuth. (1801) 1, 397.

Wurde auch von Herrn Ribbe bei Manila häufig gefangen.

LUZON, Manila, P. I. (304 W. *Schultze*).

25. *PROMECOTHECA CUMINGI* Baly, Cat. Hispid. (1858) 88.

Da die Färbung der hellen Hispinen oft erheblich variirt, rechne ich das vorliegende ♂ noch zu dieser Art. Es ist 8 mm. lang, rostrot, Flügeldecken blassbräunlich gelb, die letzten drei bis vier Fühlerglieder schwärzlich. Alle acht Punktreihen der Flügeldecken sind durchaus regelmässig, nur schiebt sich zwischen Reihe 5 und 6 vor der Mitte noch eine überzählige Reihe, die auf der Schulterbeule beginnt. Der Zahn an den vier Vorderschenkeln ist klein, breit, stumpf, der an den langen Hinterschenkeln grösser, spitz, und bedingt eine ziemlich tiefe, bogenförmige Ausrandung in den Hinterschienen.

LUZON, Manila, P. I. (2448 C. S. *Banks*).

*26. *AGONIA VANDEPOLLI* Gestro, Ann. Mus. Genova (1877) 38, 120.

Ein Exemplar; heller als normal gefärbt, der Bauch einfarbig rostrot, die Flügeldecken an der Spitze mit einem kleinen schwärzlichen Wische. Innen sind die beiden ersten Fühlerglieder rötlich.

LUZON, Manila, P. I. (2621 C. S. *Banks*).

27. *DACTYLISPA CLADOPHORA* Guér., Rev. Zool. (1841), 7.

LUZON, Manila, P. I. (2138 W. *Schultze*).

II. COCCINELLIDEN.

*28. *EPILACHNA FUSILLANIMA* Muls., Spec. (1851), 784.

LUZON, Manila, P. I. (248 C. S. *Banks*).

29. *EPILACHNA VIGINTIOCTO-PUNCTATA* Fabr., Syst. Ent. (1775), 84.

LUZON, Manila, P. I. (2236 C. S. *Banks*).

30. *HARMONIA OCTO-MACULATA* Fabr., Spec. Ins. (1781), 1, 97, und deren ab. *PHILIPPINENSIS* Muls.

LUZON, Manila, P. I. (1376 and 2874, W. Schultze).

- *31. *THEA CINCTA* Fabr., Ent. Syst., Suppl. (1798), 77.

LUZON, Manila, P. I. (2137 W. Schultze).

- *32. *COELOPHORA VIDUA* Muls., Spec. (1851), 393.

Var.? 1 Exemplar in der Färbung mit *Synia melanaria* Muls., übereinstimmend: Oberseite schwarz, glänzend, der Mund und ein feiner Saum des Kopfschildes, ein nicht breiter Saum in den Vorderecken des Thorax (vom inneren Augenrande bis zur Mitte des Seitenrandes reichend) nebst Fühlern, Beinen und der Unterseite (die Epipleuren der Flügeldecken ausgenommen) rötlich gelbbraun. Die Punktierung der Oberseite ist feiner wie in der typischen *vidua*.

LUZON, Manila, P. I., (752 W. Schultze).

- *33. *Coelophora personata* sp. nov.

Subhemisphaerica, nigra, nitida, fronte utrinque tarsisque testaceis, prothorace subtilius punctato, limbo angusto apicali maculaque magna laterali albides, elytris coccineis, macula rotunda subhumerali, fascia communi pone medium limboque suturali utrinque abbreviato nigris.

Mas: capite albido, pedibus anticis testaceis. Long. 4-5.5 mm.

LUZON, Manila, P. I. (C. S. Banks collector).

- Type No. 2678 in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

An der Zeichnung der Flügeldecken sofort zu erkennen. Dieselben sind lebhaft und glänzend gelblich rot gefärbt, eine runde Makel nahe der Basis an der Innenseite der Schulterbeule, eine gemeinschaftliche Querbinde hinter der Mitte sowie ein Naht- und oft auch ein Seitensaum schwarz. Die Querbinde ist gerade, ziemlich von gleicher Stärke und dehnt sich bis zum Seitenrande aus, seltener erreicht sie denselben nicht ganz. Mit ihr ist der Nahtsaum verbunden, der sich vorn, nahe dem Schildchen, teilt und jederseits etwas von der Naht entfernt; jeder Ast bleibt von der Basis und der Schultermakel ungefähr gleichweit getrennt. Der Seitensaum ist rot-, oder pechbraun und reicht von der Basis bis neben, oder wenig hinter die Querbinde.

Taster und Fühler rötlich gelbbraun, Kopf beim ♂ weisslich, beim ♀ schwarz, Vorderrand der Oberlippe und eine Längsmakel der Stirn jederseits rötlich gelbbraun. Thorax schwarz, ein Saum des Vorderrandes und eine damit verbundene grosse Makel in den Vorderecken, innen bogenförmig ausgerandet und hinten gerundet, nicht ganz die Basis erreichend, gelblich weiss. Schildchen schwarz, in der Mitte oft rötlich durchscheinend. Unterseite und Beine schwarz, Epipleuren der Flügeldecken, Seiten der Vorderbrust und des Bauches nebst der Tarsen (beim ♂ auch die Vorderbeine) rötlich gelbbraun, Epimeren der Mittel- und Hinterbrust gelb.

*34. *Coelophora schultzei* sp. nov.

Subhemisphaerica, dilute fulva, nitida, fronte, lateribus prothoracis guttisque 12 elytrorum, 1, 2, 2, 1 collocatis, albidis. Long. 5 mm.

LUZON, Manila, P. I. (*C. S. Banks* collector).

Von den sechs gelblich weissen Tropfen jeder Flügeldecke liegen drei, nämlich 1, 2, 4, in einem Bogen hinter einander innen, die andern drei in einem schwächeren Bogen am Seitenrande, die inneren sind kleiner, die äusseren grösser. Der erste Tropfen befindet sich an der Basis nahe dem Schildchen, der zweite viel weiter von der Naht abgerückt in ein drittel der Länge, etwas schräg nach hinten und innen von 3, welcher unmittelbar am Seitenrande liegt und schwach quer ist. Tropfen 4 und 5 bilden mit dem entsprechenden Tropfen der anderen Decke eine grade oder nach vorn leicht convexe Querreihe wenig hinter der Mitte, 6, in der Spitze, ist der grösste von allen. Am Thorax ist ungefähr das äussere Viertel gelblich weiss gefärbt.

Es macht mir besonderes Vergnügen, diese hübsche Art Herrn W. Schultze in Manila widmen zu können.

35. *CHILOMENES SEXMACULATUS* Fabr., Spec. Ins. (1781) 1, 96.

LUZON, Manila, P. I. (264 W. Schultze).

36. *HETERASPIS BILLARDIERI* Crotch, List Coccinel. (1871), 6; (*reticulata* Fabr.) Syst. Eleut. (1801), 1, 362.

LUZON, Manila, P. I. (2087 W. Schultze).

37. *SYNONYCHA GRANDIS* Thunb., Nov. Ins. Spec. (1781), 12.

LUZON, Manila, P. I. (2136 W. Schultze).

*38. *VERANIA NIGRILABRIS* Muls., Monogr. Coccin. (1866), 73.

Var.? Die Oberlippe ist nicht schwarz, sondern hell gefärbt wie der ganze Körper, der Bauch nur in der Mitte der ersten Segmente dunkler, gebräunt.

LUZON, Manila, P. I. (266 P. J. Stangl).

*39. *CHILOCORUS CERBERUS* Muls., Opusc. (1856), 148.

LUZON, Manila, P. I. (1356 C. S. Banks).

*40. *BRUMUS SUTURALIS* Fabr., Ent. Syst., Suppl. (1793), 78.

LUZON, Manila, P. I. (3765 C. S. Banks).

*41. *CRYPTOGONUS ORBICULUS* Gyllh., Schönh., Synon. Ins. (1808), 1, 2, 205.

LUZON, Manila, P. I. (4738 C. S. Banks).

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